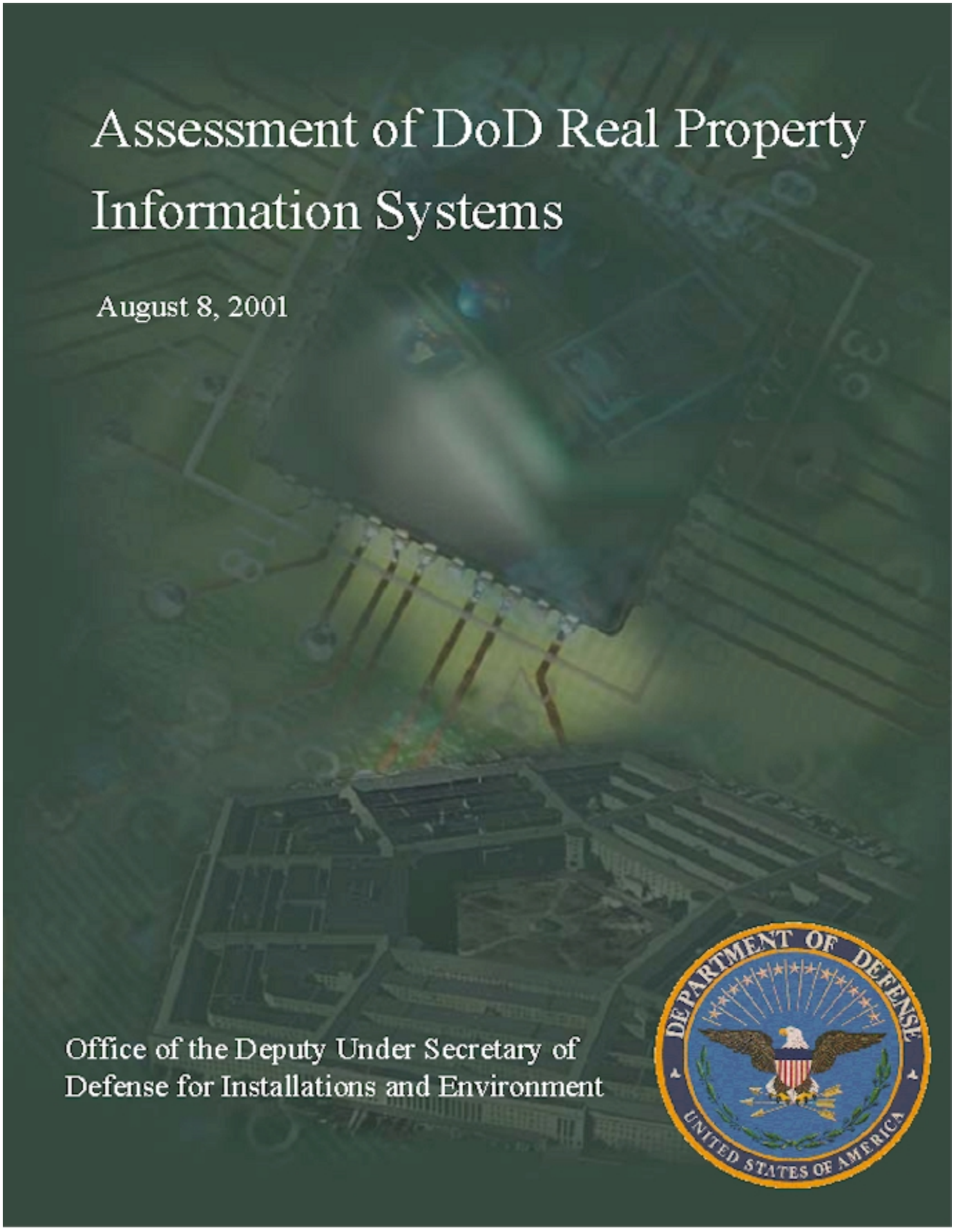
Assessment of DoD Real Property Information Systems

August 8, 2001



Office of the Deputy Under Secretary of Defense for Installations and Environment

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I. Purpose

The Department of Defense (DoD) holds legal interests in about 1 million real property holdings, structures and facilities throughout the world. The scope and variety of these assets are unmatched by any other government or private enterprise. The value of this inventory approaches $600 billion, and the funds needed to operate, sustain and recapitalize the assets exceed $30 billion each year. Real property assets are critical because they support the accomplishment of all Defense missions.

Recognizing that effective management of this diverse and vital inventory requires extensive and accurate management information, the FY2001 Program Decision Memorandum directed the Under Secretary of Defense (Acquisition, Technology & Logistics) (USD[AT&L])to:

> "… assess the ability of DoD's real property information systems, including funded improvements or replacements of those systems, to provide the information on real property required for programming and budgeting and financial reporting. … The recommendations should include a description of any changes that may be needed to existing systems, a plan for implementing those changes and a detailed statement of resources necessary to implement any changes that may be required."

This assessment views real property data as a Defense resource rather than a local, component, or functional "stovepipe" resource. It also expands the emphasis from property accountability and regulatory compliance to resource requirements' determination and decision support to provide all Defense functional communities (including the financial, program and budget communities) ready access to accurate and up-to-date real property information to enable effective management of Defense installations.

II. Report Summary

DoD's existing real property inventory systems do not meet DoD's current and projected analytic and reporting requirements and reflect the generally low priority and utility accorded them in the past. DoD is consuming too many resources to manually collect and report real property data. Relatively simple inventory-related questions can take days (or longer) to answer, as government contractors work to integrate incompatible data. These resources can be better spent to create a more effective inventory system and to develop training to support the users, including analysts and personnel responsible for real property accountability. In the absence of effective DoD-wide policy and standards, the Military Departments constructed individual systems that are not inter-operable. In some cases, these systems use antiquated "mainframe-based" technology more appropriate for the 1970s than today. Similarly, the information collected by these systems also reflects the relatively simpler requirements of that period but, for today's uses, is often incomplete, outdated, or inaccessible to significant potential users, including Defense Agencies.

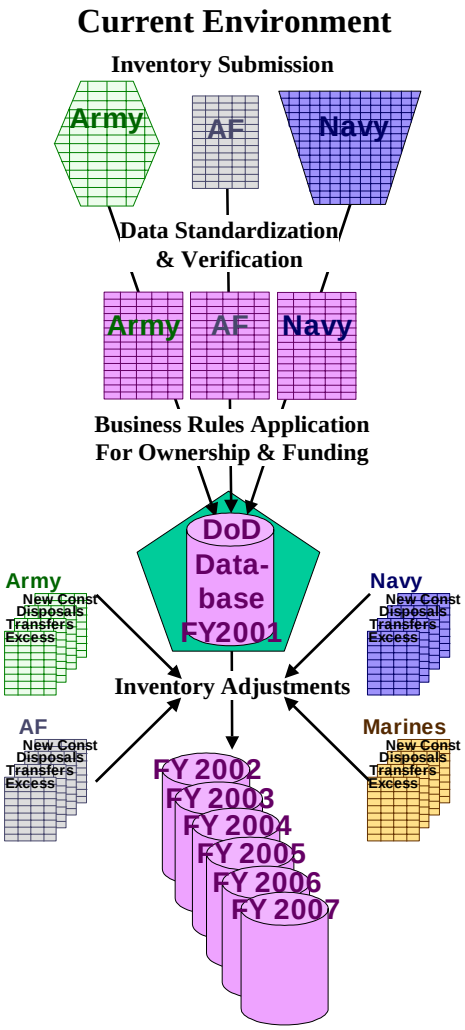

Figure 1

Real property data is becoming a more critical component in other functionals' (i.e., family housing management, environmental program management, etc.) systems. In addition, Defense Agencies have been given the responsibility for resourcing and managing the use of facilities "owned" by the Military Departments but operated by the Agencies. These functional communities and organizations often require more accurate and detailed information (such as data accumulated in Geographic Information Systems [GIS]) then the real property inventory systems provide, and even if they can get the data from each of the systems, they must then figure out the means for consolidating incompatible data. Consequently, they have created "off-line" systems to collect and record the real property data used in their business. Because these systems are often not linked with the real property inventory systems, the corrections they make to their off-line databases will frequently not be recorded in the inventory databases. It may also be difficult to share the new information collected by these systems because the data was collected in the absence of published data standards and with little foresight to integrating these new systems with the existing legacy systems. In addition, as

illustrated in Figure 1 above, the legacy inventory systems were not designed to report data to DoD for financial reporting or requirements determination. The Military Departments submit non-standard data from the legacy systems that requires substantial transformation and integration of additional data. The inventory data yields useful information for analyses only after this complex transformation. It takes several months to convert the data to a useable format for DoD-wide programming and budgeting analyses and reporting.

To improve the data systems, DoD needs to standardize data definitions, create a unified vision for real property inventory reporting, provide an incentive for maintaining the accuracy of the data, and utilize modern technology to make the information readily available across DoD.

Overarching Finding of this Study

DoD's real property information systems, including planned improvements, do not meet DoD's current and projected analytic and reporting requirements. Defense real property inventory data is:

- Incompatible across the Defense components
- Inaccessible to key users
- Inaccurate and incomplete, necessitating application of complex and inefficient business rules to use the data

These shortcomings result in:

- Wasted money as analysts expend excessive resources to produce and obtain usable information
- Inconsistent analyses that undermine credibility inside and outside the Department
- Flawed decisions, based on poor information, producing unintended consequences

Findings

DoD's current real property inventory information systems are not timely, standardized, or easily accessible, thus hindering DoD's ability to make informed facility budget and policy decisions. This situation, created by recent decisions to defer facility sustainment and recapitalization, imposes an increased and unknown risk factor into DoD's future program and budget requirements stream. This unknown risk includes the potential for increasing the life-cycle costs for facilities and for adversely impacting retention, training and readiness through degradation of living and working environments in the military.

Our major findings documented in this study include:

- Real property data collected by the Services does not meet current requirements of Service, Agency and Defense staff analysts.
  - > Inventories, by definition, look backward in time, but Service and Defense analysts need the data to conform to exacting guidelines to project future requirements.
  - > The collection of data by the Military Departments belongs to another era, before the creation of large Defense Agencies with funding responsibility for the maintenance of real property and before significant joint use of installations.
  - > Outside Service real property "stovepipes," real property data cannot be accessed, integrated and utilized in a timely manner.
  - > The Services designed their systems and data independently, lacking relevant guidance from the Office of the Secretary of Defense (OSD), to meet basic internal property management needs and minimal external reporting requirements. The systems were not designed to meet growing demands, including data to support compliance with the Chief Financial Officers (CFO) Act of 1990, new methodologies for program and budget analysis, new management and reporting requirements for Defense Agencies and new operational information requirements for installation management, medical activities, emergency response and environmental management.
- The lack of DoD-wide data standards effectively precludes integration of the three Military Departments' inventories, significantly hindering DoD-level analysis.
  - > Data must undergo complex and lengthy transformation, manipulation and validation to create a usable, but still rudimentary, inventory at DoD level.
  - > Only a few contractors have expert knowledge of how to transform and consolidate the inventory. Many analysts required to use inventory data do not understand its intricacies and cannot provide accurate assessments.
- Consolidated real property inventory data is not readily available to most Defense analysts.
  - > Even Office of the Deputy Under Secretary of Defense (Installations & Environment) (ODUSD[I&E]) analysts have no direct access to the data and must submit requests to a contractor to run queries. Other DoD analysts have no access whatsoever.
  - > Defense and staff analysts waste time and money obtaining accurate real property data that should already be available to meet their information requirements. They create specialized, stand-alone databases (such as

those created for Base Realignment and Closure [BRAC] and Quadrennial Defense Review [QDR] analyses) to overcome this deficiency.

> Defense Agencies and other functional communities collect their own real property data and create off-line databases not linked with current inventory databases. These users make corrections in the off-line systems that are not consistently passed on to the Military Departments' inventory databases. These disconnects create reporting and analytic discrepancies.

> While some geo-spatial data standards have been established within DoD, there are few standardized requirements for collecting and maintaining geo-spatial data. Many installations have no or minimal GIS capability. Each command, functional area, and/or local commander has resourced his/her own requirements as funds have been made available using a variety of systems and standards often ignoring DoD spatial data standards. This will generate additional costs and time to create new and integrate existing data.

- The accuracy, completeness and timeliness of real property inventory data remains problematical.
  > Many physical inventories of real property are not being conducted every five years as required in DoD's *Financial Management Regulation*.[1 &2]
  > Changes to real property records are often not posted in a timely manner.[3]
  > Inventories do not consistently record all real property "interests," such as leases.
- Due to the tremendous pressure on "infrastructure" accounts, appropriate funding for modernization and upkeep of real property inventories and related systems is generally not available.
- The operating environment in DoD is creating opportunities for change.
  > Technology is greatly expanding the ability to maintain and access large amounts of data quickly, but DoD is not taking full advantage of these changes.

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[1] Air Force Audit Agency, *Accounting for Air Force Real Property, Fiscal Year 1999 Audit Report* (99053006, 24 August 2000), p. 7.

[2] Department of the Navy, Navy Audit Service, Department of the Navy Principal Statements for FY 1999: Reporting of Real Property (Buildings, Structures, and Facilities), (Report Number 1999-0142, 12 May 2000), p. 1.

[3] Department of Defense, Office of the Inspector General, *Accuracy of the FY 1999 Additions, Deletions, and Modifications to the Military Departments' Real Property Databases* (Report No. D-2000-172, August 11, 2000), pp. 1-2.

> ODUSD(I&E) has created several working groups to enhance inter-Departmental understanding of the databases and manage changes.

> Real property systems are in the process of being electronically linked to financial systems to meet financial reporting requirements.

> The expanded uses for and increased scrutiny of real property data has improved awareness of the need to maintain accurate records.

Recommendations

Our recommendations are divided into two sections: short-term (within 1-2 years) and long-term (within 3-5 years). Implementing these recommendations will provide DoD with a real property system that provides consistent, accurate and timely data for reporting and analyses, which will result in the ability to more effectively manage Defense resources and support achievement of DoD's missions.

We believe it is imperative for OSD, working with the Services, to immediately standardize data elements and to make the consolidated DoD real property inventory data readily accessible to the entire Defense community. ODUSD(I&E)'s focus should be on establishing data standards and an operating environment for accessing the data.

Key Enabling Recommendations

- ODUSD(I&E), the Services and Defense Agencies establish, publish, and enforce real property inventory data standards.
- ODUSD(I&E) maintain a web-accessible, consolidated Defense real property inventory database for use by all DoD activities and analysts.
- ODUSD(I&E), the Services and Defense Agencies create an incentive program for maintaining high-quality data.

Short-Term

- ODUSD(I&E), with the Services and Defense Agencies, establish real property inventory requirements to be published in a revision to DoDI 4165.14.

> Establish clear policy for real property accountability to ensure all DoD real property interests are reported and are not double counted.

> Identify and confirm the critical real property inventory data requirements such as acquisition date and value, recapitalization actions, size/capacity, functions and owner and user identification and responsibilities.

> Publish and publicize the revised DoDI 4165.14 this year with an implementation date of September 30, 2002.

> **Impact:** Enables cross-functional and cross-service/agency communication and analyses to better assess DoD requirements. Enables the Services to improve data quality, consistency and completeness. Provides system developers with data standards when designing or altering systems to create, use, store and transfer real property data. Eliminates the need for data manipulation and transformation. (See Figure 2. The data in the inventory submissions is standardized requiring no transformation, and the new required data elements reduce the requirement for additional data calls limited to program adjustments beyond Budget Year 3 [FY 2005 in Figure 2].)

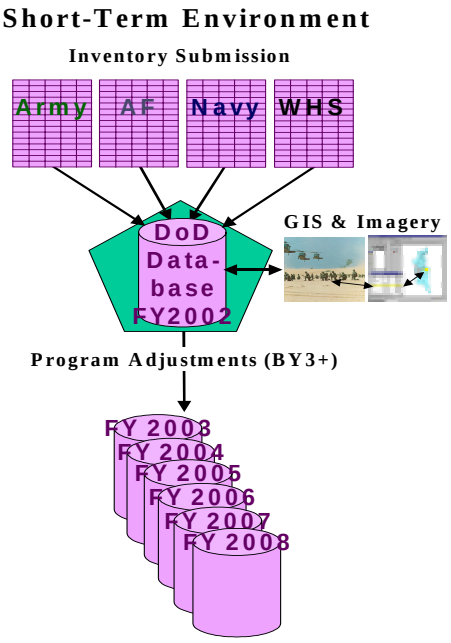

Figure 2

- ODUSD(I&E), as the functional proponent for installations' requirements and management, assume responsibility for and create a consolidated real property inventory database that is web-accessible.

  > Migrate the existing OD(PA&E) real property data into a new database that meets the requirements established in DoDI 4165.14.

  > Place database on web for use by Service, Agency and staff analysts to provide analyses enabling their leaders to improve management and make decisions entailing less risk for DoD.

  > **Impact:** Enables cross-functional and cross-service/agency communication and analyses. Provides all DoD users with real-time, online remote access to a single, corporate real property inventory database to meet their functional information requirements. Reduces the learning curve for Agency and staff analysts by moving to a single, integrated database. Enables Service, Agency and staff analysts to consistently arrive at the same answer to a given question while mitigating the risk of misinterpretation. Allows more scrutiny of the data to identify and resolve problems with the data.

- ODUSD(I&E), with the Services and Defense Agencies, create a strategic plan for implementing the recommendations of this study.

  > Establish the desired future state for the real property accountability function.

> Identify expanded real property data requirements, including operational capacity data, to meet the needs of the broader Defense community and enhance installation management.

> Create a strategic plan to identify and fix responsibility for implementation actions.

> **Impact:** Involves the real property accountability community in creating a shared vision with goals and objectives for creating an accurate, timely and useful real property information system to be implemented in the future. Achieves unity of purpose for developing, assessing, prioritizing and resourcing implementation actions.

- ODUSD(I&E) expand the capability of the web-accessible real property inventory database to incorporate a standardized, automated visualization management tool that integrates the real property inventory data with selected GIS, imagery and new operational capacity data to support current and to project future Service and Joint installation management capabilities and requirements.

> Survey on-going GIS and imagery efforts and existing capabilities and information within DoD.

> Establish a DoD working group to develop policy, standards, and data definitions for the GIS, imagery and new operational capacity data.

> Based on standards and requirements defined by the DoD working group, develop a web-based, automated visualization capability using commercial off-the the-shelf (COTS) GIS and relational database software to integrate real property inventory information with GIS, imagery and operational capacity data.

> Collect baseline GIS, imagery and operational capacity data.

> **Impact:** Provides a standardized visual installation management tool to support current and projected future installation management requirements. Provides a baseline platform system to enhance and/or add capabilities consistent with current and emerging installation management requirements. Enables integrating enhanced real property inventory data with selected GIS overlay and imagery information.

- OSD and the Military Departments program and budget resources to implement the plan.

> **Impact:** Provides tangible leadership support that establishes credibility with local staff responsible for maintaining data and signifies the importance of accurate, timely real property data.

- ODUSD(I&E), with the Services and Defense Agencies, create and implement an incentive program for maintaining accurate, up-to-date real property records.

> Establish data quality standards.

> Continue field and database audits and emphasize performance of physical inventories to improve completeness and accuracy of the data.

> Provide both personal recognition and tangible rewards for maintaining high quality data.

> Provide a mechanism for inaccurate data to be challenged by tenants.

> **Impact:** Verifies the quality of source data to improve confidence in analyses using the data. Provides early warning of "bad" data to facilitate timely correction. Provides motivation for real property accountable personnel to maintain up-to-date, complete and accurate records.

- ODUSD(I&E) be proactive in responding to other functional communities' (e.g., environmental, medical, DoD Education Activity, housing) data requirements and in encouraging their use of DoD consolidated database.

> Provide open access to targeted DoD real property data at all levels of organization via web technology. This will leverage the investment made by one organization to expand the overall benefits gained by DoD. For example, by making selected GIS files created by an installation accessible throughout DoD, other organizations such as the Joint Chiefs of Staff (JCS) or the Defense Logistics Agency (DLA) may be able to fulfill certain time-sensitive information needs with no additional cost.

> Assign proponency for data elements shared across functional communities.

> Establish the consolidated database as DoD official corporate database of record.

> **Impact:** Leverages resources already expended to collect data. Reduces costs for collecting and accessing data across the Department, while encouraging collaboration. Further enforces standards and ensures consistency of use and understanding.

- ODUSD(I&E) continue to develop and field standard real property analytic tools.

> Continue refining the Facility Sustainment Model.

> Standardize the calculation for Plant Replacement Value.

> Add a calculated "Adjusted Year Built" field to the inventory database to reflect the effective (versus the chronological) age of a facility.

> **Impact:** Encourages consistency in analysis. Projects impact of resource trends on real property. Enables effective risk assessments and decision making.

Long-Term

- The Services incorporate new data standards into their existing information systems including GIS systems.
  - > Add new data elements required by DoDI.
  - > Enforce the use of standardized valid codes and values.
  - > Apply standard terminology and definitions.
  - > Emphasize conducting physical inventories of real property, continuous updating of real property inventory data and annual updates of selected GIS and operational data to ensure complete and accurate records.
  - > Refresh imagery on a 3-5 year cycle to support GIS visualization of the real property inventory and related physical and operational capacity data.
  - > **Impacts:** Enables the Services' data to be shared across DoD and with other systems without transformation. Creates a predictable, comprehensible process for system change allowing for the identification of costs and fixing responsibility for resourcing the costs. Reduces the requirements and costs to build new interfaces and creates the potential for sharing/reusing applications across DoD thus reducing system development and data transfer costs. Enables imagery updates to maintain relevance of GIS visualization.

- Build a new DoD-wide real property-related installation management system.
  - > Develop a single virtual, multi-layer, cross-organization integrated and shared database. Data may be accessed where it is created, yet it will appear as a single database to the user.
  - > Build function-specific applications for entering data into and retrieving information from the corporate database.
  - > Provide real-time, online, remote access by using the latest technology including enterprise reporting and voice and video technology and enhancing GIS and imagery capabilities.

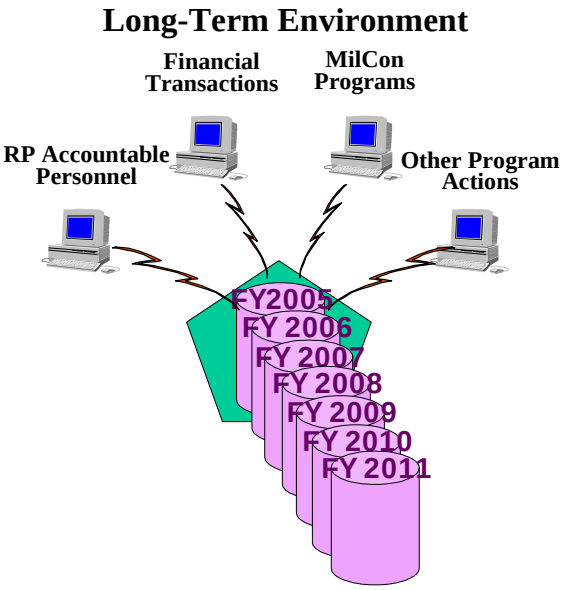

Figure 3

  - > Engineer into systems the quality edits and audits needed to monitor and maintain accuracy.

> **Impacts:** Minimizes maintenance costs and the number of interfaces by leveraging technology and reducing redundancy. Significantly reduces the software modification lifecycle and enables the real property system to be responsive to changes in real property business requirements. Provides Services, Agencies and staff with a consistent real-time view of the entire real property business area and a standard installation visualization platform for current and future Joint and Service installation management requirements. Improves the usability of information, promotes wider use, and leverages current resources to further reduce long-term system and analytic costs. (See Figure 3 above. Real property accountable personnel maintain their inventories in or periodically transmit them to the central database. This database is linked with financial systems, military construction data systems and others to share data required to generate projected inventories. This shared use eliminates data calls and requests.)

Advantages Gained from the Proposed Improvements

The entire Defense community will greatly benefit by moving to the recommended new operating environment and system. The recommendations are designed to refocus and leverage the resources that are currently expended to create significantly more value for a wider DoD audience. The long-term recommendations cannot be achieved, however, without the cooperation of the Services, Agencies and OSD. Only after data standards have been established, conveyed to the user community and internalized through cultural change, will it make sense to expend resources on migration to a single DoD-wide database.

The new real property inventory system proposed for DoD-wide use does not relieve the Military Departments and WHS of their responsibility for maintaining real property inventory records. The proposed system's controls can be designed to give these organizations full control of, and responsibility for, entering and maintaining the inventory data.

We recognize that DoD faces significant challenges in implementing the recommendations. These include:

- Unresourced initial costs for implementation;
- Resistance to change;
- Maintenance and operation of legacy systems during the transition to the new system.

Nevertheless, DoD will gain very substantial benefits for their efforts. These advantages include:

- More accurate data faster enabling more uses of data as a resource predictor;
- Shared community-wide interest in meeting users' data requirements;

- Improved opportunity for analyses and more confident decision making;
- Expanded access to and use of geo-spatial data that is inherently costly to develop but valuable to DoD organizations beyond the sponsoring organization;
- Capability to visually link real property inventory data with GIS, imagery and operational capabilities;
- Readily understood and accessible data;
- Significantly reduced number of out-of-cycle data calls and data requests made to the Services and real property accountable personnel, thereby freeing resources to maintain accurate records;
- Reduced long-term costs;
- Reduced number of systems and interfaces to develop and maintain;
- Responsibility shifted to a single source, ODUSD(I&E), for providing access to real property installation management data;
- Predictable costs for future changes that can be budgeted and resourced by the requiring organization once the transition to the revised data structure is completed; and
- Minimized cost for sharing and/or adapting applications.

III. Assessment

In this section, we provide our assessment of the current Defense real property environment in the form of a strategic perspective built around a recommended vision. This material is intended to provide the basis for developing a strategic plan for the Defense real property accountability community. The recommended vision developed below also provides the context for the recommendations presented in the next section of the report.

Our goal is to establish for the reader the kinds of requirements prudent Defense officials should strive to meet and to propose reasonable steps for implementation. In short, this report's primary focus is for shaping the future not creating a historical record.

A. Current Environment

Appendix A provides a detailed description of the current environment in DoD as it relates to the real property inventory information and systems and the uses for which this information is required. With each passing year, more functional communities and Defense Components find it necessary to access real property data. Until the 1990s, this data primarily supported the base engineering community -- charged with property accountability and facilities maintenance, and the Services' major commands responsible for stationing units and organizations and for providing adequate facilities. Starting in the late 1980s, the need to use real property inventory data significantly increased with the emergence of new missions for environmental compliance, clean-up, pollution prevention and conservation and preservation and with the initiation of a series of four rounds of Base Realignment and Closure (BRAC). In the 1990s, the CFO Act and the financial accounting requirements established for Defense revolving funds required DoD to formally capitalize and depreciate real property assets. Several years later, Defense leaders began demanding budget requirements for facilities programs be developed based on a unit cost approach that ties to the actual inventory, rather than on previous budget or expenditure levels. This trend is continuing into the present decade with the current Defense-wide effort to document all training ranges and their uses with geo-spatial data. In addition, Congress has also been requesting increasingly detailed information about Defense real property. Federal government and Defense audit activities have increased their scrutiny of real property records. This increased attention has coincided with a significant reduction in Defense resources and staffs, especially at the installation level. During the past decade of declining budgets, the services' priorities have centered on modernizing weapon systems while real property programs were, and remain, a relatively low priority in DoD. Consequently, at the local level, budget cuts have led to a significant reduction in real property management staff with some local managers de-emphasizing the maintenance of accurate, up-to-date real property records.

The Military Departments are making some improvements to existing systems. These improvements are being driven by expanded internal requirements, unfavorable audit findings, Chief Financial Officer (CFO) Act requirements and, perhaps most importantly,

use of the data by OSD to create requirements models (such as DoD Facilities Sustainment Model [FSM]), which evaluate funding levels for real property programs. However, to function properly, the models are built on a complex foundation of "business rules" and additional data calls that compensate for inadequacies in the underlying data and systems. The inventory systems were not designed to report data to DoD for financial reporting or requirements determination.

U.S. law and DoD regulations and instructions establish real property accountability and financial reporting requirements. Appendix B provides the text from specific sections of U.S. law and excerpts from regulations cited in Appendix A. The three Military Departments (Army, Navy and Air Force) and Washington Headquarters Services (WHS) maintain Defense real property accountability records. Real property records are maintained locally by personnel responsible for maintaining the physical records and for entering inventory data into the real property inventory systems. All three Military Departments collect their inventory data into a central repository. The Army provides their Army Headquarters staff with access to their consolidated data, and the Air Force and Navy provide their headquarters staffs with a data extract. The Services' staffs subsequently pass this data to ODUSD(I&E) for inclusion in OSD's Facility Assessment Database (FAD).

DoD has implemented the regulatory inventory requirements via DoD Instruction 4165.14, *Inventory of Military Real Property*, dated August 25, 1977. ODUSD(I&E) is in the process of drafting and staffing a revised DoDI to replace the 1977 version. The new draft will identify and standardize data elements deemed essential at the OSD level for real property accountability and for meeting DoD's immediate financial, programming and budgeting requirements. In this report, several of the short-term recommendations are based on implementing the requirements of the new DoDI 4165.14.

In auditing real property records supporting DoD's FY 1998 financial statements, DoD Inspector General (DoDIG) reported that the real property databases used for the FY 1998 financial statements "contained sufficiently accurate inventories of real property with values greater than $100,000. Sampling results showed that, at the 90 percent confidence level, the Military Departments had less than a 5% error rate for unaccounted items."[4] This finding is often misinterpreted to mean that real property accountability is in satisfactory shape. However, the finding only applies to "unaccounted items" and does not relate to the quality of the data for items in the inventory, nor does it address the efficiency of the systems or their utility. In the same report, DoDIG reported, "The test results on the accuracy of key data elements were inconclusive because DoD policy guidelines did not specify or define documentation for the Military Departments to maintain for the key data elements and the documentation was inconsistent."[5] Therefore,

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[4] Department of Defense, Office of the Inspector General, *Reliability of the Military Departments Real Property Databases for Existence and Completeness* (Report No. 99-243, August 27, 1999), p. i.

[5] *Ibid*., p. 3.

while the data may be adequate for financial reporting, the data may not meet the more rigorous quality standards and validation requirements to support the Services, Agencies and OSD resource determination requirements and decision support.

Appendix C provides the list of audit reports reviewed in preparation for this report. These reports are listed by reference number in Appendix C and discussed in Appendix A. Audits by the various service audit agencies of FY 1999 inventories revealed a host of common shortcomings including:

- Records were not adjusted for demolished property.
- New structures were not always added to inventories.
- Capital improvements were not always recorded.
- Physical inventories were not being performed every five years as required by DoD regulations.

In a 1999 report (reference 2c), the U.S. General Accounting Office (GAO) stated that DoD does not have a comprehensive strategy for maintaining its infrastructure with each service setting its own standards and priorities for maintenance and establishing its own criteria for rating facility conditions. GAO further observed that, because of these variances, data drawn from across the services, including from rating systems, is generally incomplete and inconsistent and the Congress cannot be assured that its appropriations for maintenance and repairs provide the best return on investment.[6] One of the GAO's recommendations was:

GAO Recommendation

DoD create online inventory and cost databases to track real property maintenance (RPM) spending and activity across and within the services and with direct access by OSD to permit meaningful comparisons across the Department.

The driver of change in real property accountability is shifting from responses to financial statement requirements to needs that are more business driven: functional area requirements. The GAO report on real property management cited above points toward compelling business requirements: justification of resource requirements to Congress to secure funding for real property support. **This report will stress using business requirements instead of regulatory compliance to drive change and improvement in real property accountability.**

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[6] U.S. General Accounting Office, *Military Infrastructure: Real Property Management Needs Improvement*, U.S. Senate, (NSIAD-99-100, September 1999, p. 147.

B. Future Environment - A Strategic Perspective for Real Property Accountability

The current environment requires significant change. OSD and Service headquarters analysts and functional users' communities require immediate access to accurate, up-to-date, standardized real property inventory data. However, before we launch into a description of requirements and propose solutions, it is necessary to create a strategic perspective or context within which to develop further requirements and identify specific actions required for implementation. DoD does not have a strategic plan for the real property accountability function. In this section, we will create a strategic perspective within which we will develop our recommendations. This strategic perspective can be used as a starting point for developing a strategic plan.

Mission for the Real Property Accountability Function

The real property accountability function as it exists in DoD today is designed for the following missions:

- Account for real property;
- Provide data for local real property management; and
- Provide data and information for higher Service headquarters for reporting and analyses.

In keeping with the proposed philosophy, the following changes to the above missions should become central to this function:

- Transform from "provide real property data" to "ensure DoD-wide accessibility to current real property data"; and
- Add "establish and enforce real property data standards across DoD to facilitate data integration and analyses."

Therefore, the following mission statement is proposed for Defense real property accountability:

Proposed Mission Statement

Maintain and provide accurate, standardized real property information readily accessible to all Defense users

Planning Assumptions

We made the following planning assumptions for this report and used them to generate specific recommendations:

- Audit attention and interest will remain high for the foreseeable future;
- Real property data will become increasingly important in determining program and budget levels;
- Demands for visibility of and access to real property information will increase – requirements for this information from outside the engineering community will exceed requirements from the engineering community;
- Information technology will facilitate the maintenance of real property accountability data in one central location;
- Data will not have to be moved - users will be able to access data where it lies.
- Accountability will remain with the engineering community; and
- Locally or regionally assigned accountable officials will continue to be required to perform physical inventories and to certify and ensure real property records are properly maintained.

SWOT Analysis

Our analysis identified the following strengths, weaknesses, opportunities and threats (SWOT) associated with the an initiative to modernize DoD's real property inventory systems by ultimately migrating to a single, web-based, OSD-maintained, "official" real property inventory system:

Strengths

- Real property personnel are assigned to most installations;
- Real property data has been collected for over 50 years and provides the information foundation for much of DoD's base engineering function;
- Real property databases exist, and accuracy is improving significantly;
- A professional and regulatory support structure exists;
- Real property accountability training is available;
- The real property workforce has extensive experience and familiarity with recurring requests for information; and
- OSD has established working groups and panels involving Service, Agency and OSD staffs to address real property issues.

Weaknesses

- Data terminology and definitions are inconsistent from level to level and across services and functional communities;
- OSD has not effectively articulated real property information requirements (established and enforced standards);
- Most analysts must depend on contractors to configure data for, gain access to and retrieve desired information from systems;
- Few HQ analysts exist with a broad enough perspective to encompass real property management and accountability and DoD analytic requirements;
- Files must be passed through multiple levels for data to reach OSD, and they must undergo a complex transformation process or substantial manipulation before the data can be used;
- Some major real property databases are maintained as flat files as opposed to a relational database;
- Real property programs are generally low priority in Defense;
- Generally, current and accurate real property records are not maintained throughout DoD;
- Outside of OSD's working groups and panels, the Services and Agencies do not coordinate their real property inventory, database and system efforts and share lessons learned;
- The Services are investing significant resources in revisions to real property databases and systems that are based on outmoded data entry and collection methods;
- At the installation level, real property personnel are largely unaware of how their information is used as well as its potential impacts. In many organizations where accurate information has little impact on their business, the real property data is not maintained and up-to-date; and
- There is high turnover in an aging real property workforce and difficulty in filling vacancies.

Opportunities

- The CFO Act and working capital fund (WCF) requirements have generated financial requirements requiring accurate real property information;
- Recent audits have exposed data problems and generated more emphasis on maintaining accurate records;
- OD(PA&E) has a strong interest in making extensive use of real property data in generating and evaluating Defense program requirements.
- USD(AT&L) has established a project office to improve OSD property accountability and reporting;

- Technology is greatly expanding the ability to maintain and access large amounts of data quickly;
- ODUSD(I&E)'s working groups and panels have created an environment that enhances cross-staff and cross-functional understanding of each other's requirements/challenges and enhances identification of feasible actions for application throughout DoD;
- The use of automated real property inventory data by base engineering activities and command headquarters is increasing as access and data usability improve.

Threats

- A large percentage of real property specialists will retire in the next five years, and there is a shortage of few replacements;
- Questionable data quality and inconsistent use (understanding) of data reduces the credibility of analyses, crippling the ability to effectively compete for scarce resources;
- Other functional communities are taking control of large parts of the real property information disconnected from the source databases and causing further inconsistencies in reports and analyses;
- Proponents of current automated real property systems may feel threatened by proposed changes and be resistant to change; and
- There is Service resistance to merging the three Departments' data for fear OSD will gain too much control.

Vision Development

Future requirements should be developed using a clearly established vision to identify appropriate actions and achieve the real property accountability mission. Based on the proposed mission statement, we believe the following attributes describe the future environment toward which the recommendations in this report should advance the real property accountability environment:

- Data is entered once at source and accessed from a central source; no data calls or data movement is required;
- Data records are complete and current with management controls to periodically monitor completeness and accuracy;
- Analysts have real-time DoD-wide access to required data and definitions;
- Analysts at all levels are using data from the same data sources;
- Analysts spend minimal time searching for data and more time performing analyses;

- Real property accountable officers spend less time responding to data requests and more time tending to data quality;
- Real property accountable officers are motivated to maintain complete and accurate records;
- Adaptable information architecture readily supports expansion to accommodate new requirements such as linking to geo-spatial data;
- Resources needed to obtain and maintain real property information are significantly reduced; and
- The database and the application are separate entities:
  - > The database is a virtual representation of the real property accountability function and is a single, shared resource accepted by all Departments; and
  - > The application is an input/output device designed to support specialized functional requirements.

Therefore, the following vision statement is proposed for the Defense real property accountability function:

Proposed Vision Statement

Real-time, online access to DoD-wide real property information credible with federal leadership, available to all Defense users, maintained by accountable individuals dedicated to maintaining quality, and used to influence and support leadership decisions

Proposed Goals to Achieve Vision

We identified the following goals to achieve our vision for the real property accountability function:

- Motivated real property accountability professionals maintain real property records current within an acceptable error rate;
- All Defense users and systems have real-time access to standardized real property information;
- Defense analysts focus on their core competency – analysis, and not searching for, challenging, scrutinizing, validating and transforming data;
- Analyses dependent on real property information are credible with all federal and congressional users; and
- The resources used to transfer and transform data are reduced and redirected to improve maintenance and accessibility of data.

IV. Requirements and Recommendations

Our requirements and recommendations are divided into two sections: short-term within the next 1-2 years and long-term within 3-5 years. We developed the recommendations to directly address the goals established in the strategic perspective.

A. Short-Term

Based on research and interviews, we have identified two critical requirements for immediate implementation:

- Standardize data, and
- Provide ready access to inventory data.

These two efforts form the foundation for achieving the third requirement – accurate real property data. We have organized our short-term recommendations into six major groups: (1) Establish real property inventory requirements; (2) Create and maintain a web-accessible database; (3) Create a strategic plan; (4) Implement an incentive program; (5) Cater to other functionals' data requirements; and (6) Develop standard real property analytic tools. We believe the short-term recommendations can be substantially completed within two years.

1. ODUSD(I&E), with the Services, establish and publish real property inventory requirements

Throughout this document we've repeatedly pointed to a lack of standardization as a significant factor contributing to unreliable real property data. Data extracted from the source and used out of context or improperly related to other independent data sources further complicates the problem and reduces confidence in the credibility of real property data. In the near term, technology can contribute very little to the solution. At the root of the problem are non-standard processes for creating, collecting, storing and transferring information about real property and the resulting non-standard data. The business problem, lack of standards, must be resolved before any appreciable gain can be achieved through technology infusion. Implementing the recommendations below will:

- Enable cross-functional and cross-service/agency communication and analyses to better assess DoD requirements;
- Enable the Services to improve data quality, consistency and completeness;
- Provide system developers with data standards when designing or altering systems to create, use, store and transfer real property data; and
- Eliminate the need for data manipulation and transformation.
- Reduce the Services' development costs as data models are shared for functional systems.

a. Establish clear policy for real property accountability

We discovered that WHS is not reporting its real property inventory to ODUSD(I&E). We also determined that leases are not consistently being included in any of the real property inventories. We recommend ODUSD(I&E) clearly address the following issues/policies in its revision of DoDI 4165.14 or other appropriate guidance:

- Fix responsibility for real property accountability by Defense component to ensure interests and assets are neither omitted nor double counted;
- Define all real property interests required to be accounted for in the inventories; and
- Require all real property interests, including assets worth less than the capitalization threshold (currently $100,000), be accounted for in the inventories.

b. Identify and confirm critical real property inventory data requirements

The Military Departments maintain real property inventories which, to combine into a single DoD database, requires significant transformation. Only a few contractor personnel are expert at this transformation. The first essential step is for OSD to establish standard terminology, standard definitions, standard values (codes, types, etc.) and standard data structures and formats.

We strongly recommend that DUSD(I&E) seize the opportunity to establish DoD-wide real property inventory standards by coordinating both DoDI and the data model with all functional communities requiring real property data and at all organizational levels to achieve consensus. ODUSD(I&E) should solicit challenges and carefully consider the concerns of the extended user community. Establishing standard data elements is a necessary precondition for producing accurate and up-to-date information.

It is also important to confirm the critical real property inventory data requirements such as acquisition date and value, recapitalization actions, size/capacity, functions and owner and user identification and responsibilities. This confirmation will allow auditors to effectively target efforts on the information most critical to DoD. The critical data elements proposed for the revised DoDI not only address the physical inventory data but also include elements required to meet financial reporting and programming and budgeting requirements.

Appendix E provides an initial analysis of how well the Military Departments' current inventory data systems (Integrated Facilities System [IFS]; Internet, Navy Facility Assets Data Store [iNFADS]; and Automated Civil Engineer System – Real Property module [ACES-RP]) match to the new standards. The following table summarizes our initial comparison between the 36 data elements in the new DoDI and the data elements resident in, or accessible to, each of the systems.

Agency	System	Same Definition, Data Size, Data Format	Data Found - One or More Mismatches in: Definition, Data Size, Data Format; or Clarification Required	Data Not Found
Army	**IFS**	33	3	0
Navy	**iNFADS**	25	5	6
Air Force	**ACES-RP**	26	5	5
WHS	**Under Development**	NA	NA	NA

The Military Departments' systems will require changes to modify or add data elements to incorporate the new data standards.

We also created a data model based on the proposed DoDI data elements. This model is provided in Appendix F along with a table providing the entity and attribute descriptions. The data model reflects several enhancements not included in the current draft DoDI that we believe are necessary for both functional and technical accuracy and for completeness. These enhancements are not as important as the critical 36 elements currently being staffed for inclusion in the revised DoDI. The enhancements can be addressed in the expanded model that we propose in recommendation 3b below after DoD's real property community develops a strategic perspective to implement the accepted recommendations.

To the greatest extent possible, any codes required in the database should be drawn from federal standard sources, or lacking these, from established Defense standards. For example, using geographic location codes (GEOLOCs) assigned by the Joint Staff to designate specific installations and Defense sites can eliminate the requirement to enter other location information such as city, county, state and/or country information. The GEOLOC can be tied to other tables to extract other locality information. Federal Emergency Management Agency (FEMA) model building type codes can be used to designate construction type in DoD inventory. By using standard codes, all Defense activities will be able to readily link real property inventory data directly with other Defense and federal databases and applications. This will also reduce the burden on real property accountable personnel by eliminating the necessity to enter some of the data for each new property record. The use of standard codes will enable sharing data across Defense and federal agencies and reduce software and system development and sustainment costs. Use of standard codes also supports benchmarking.

c. Publish and publicize the revised DoDI 4165.14 this year with an implementation date of September 30, 2002

We believe it is important to publish the new data and policy requirements as soon as possible. For this reason, we support the decision to include only the critical data elements that have already been coordinated with the Real Property Reporting Panel and

to develop a more complete set of requirements as part of the strategic planning process discussed in 3 below.

We recommend DUSD(I&E) issue interim guidance to announce the policy changes and data standards as soon as they are approved and the standards implemented effective September 30, 2002. OSD has requested the FY 2002 inventory data be provided in conformance with DoDI standards. Figure 4 below illustrates the impact this change will have on the current process OSD uses to transform the data. The Services and WHS will submit their data requiring no transformation, and inventory adjustments will be required only for program adjustments projected beyond Budget Year 3 (FY 2005 in Figure 4).

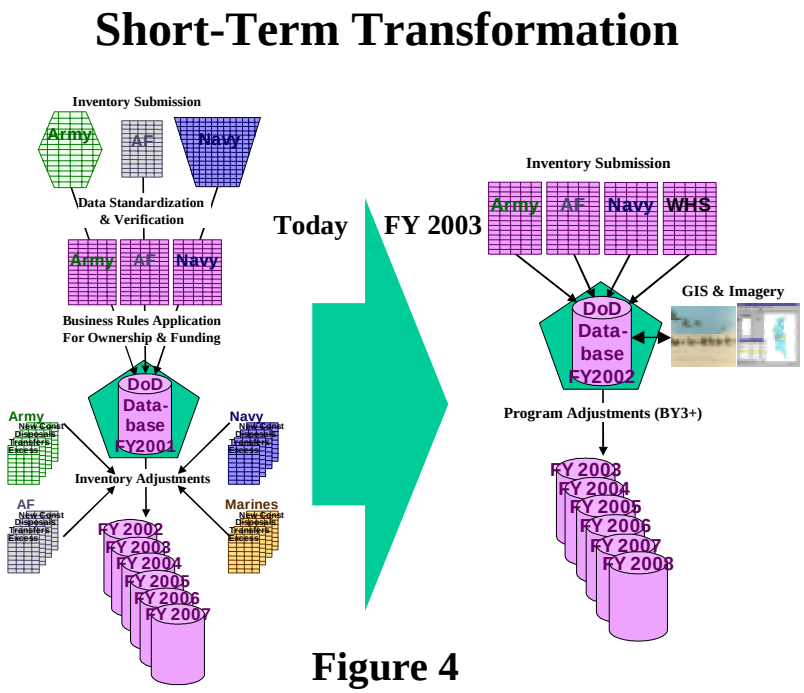


Figure 4

In addition, we recommend ODUSD(I&E) participate in base engineering and real property management conferences by briefing the changes and leading discussion groups. The new policy changes and standards should also be promulgated by way of the Services' real property training courses. ODUSD(I&E), or an agent, should periodically review the courses to verify that the training material promotes an understanding of how information is used at the headquarters level, that most recent improvements and standards are identified and that each course is in full compliance with the latest DoDI.

We also recommend information material be incorporated into a training package developed for and posted to the ODUSD(I&E) website.

2. ODUSD(I&E) assume responsibility for and possession of consolidated real property inventory database and make the database web-accessible

Today, at OSD, DoD real property inventory data from 1989 thru 2000 is maintained by OD(PA&E) in FAD. To obtain extracts of data for analysis, ODUSD(I&E) submits requests to OD(PA&E) for approval. The database is not directly accessible to Defense analysts.

ODUSD(I&E) is the functional proponent for installations' requirements and management within DoD. They do not "own" a real property information system. The data submitted officially by each Military Department is incorporated into FAD to create an "official" DoD view of the real property inventory. As the functional proponent, ODUSD(I&E) should maintain this "official" view to ensure it is available throughout DoD as a corporate information resource supporting the management and resourcing of DoD installations. Implementing the recommendations below will:

- Enable cross-functional and cross-service/agency communication and analyses;
- Provide all DoD users with real-time, online remote access to a single, corporate real property database to meet their functional information requirements;
- Reduce the learning curve for Agency and staff analysts by moving to a single, integrated database;
- Enable Service, Agency and staff analysts to consistently arrive at the same answer to a given question or recreate the conditions generating different answers and mitigates the risk of misinterpretation; and
- Allows more scrutiny of the data to identify and communicate problems found in the data to the Services and correct long-standing problems not visible at the base or Service level.

a. Migrate the existing OD(PA&E) real property data into a new database

As soon as the critical data standards and model are validated and ODUSD(I&E) is given responsibility for maintaining the data, we urge ODUSD(I&E) move immediately to create a relational database using the validated data model in preparation for creating a web application to access the data. We recommend reconfiguring the FY 2000 data from the FAD to first populate the new database. The remaining years' FAD historical data (FY 1989 through FY 1999) can be reconfigured as time and resources allow. The new database should be hosted in SQL Server, Oracle, or similar engine to achieve reasonable performance in a web environment.

We recommend following the same procedures for conducting this fall's data call for FY 2001 data. In coordination with the Services, require the data call for the FY2002 inventory be submitted using the new standards. The highest priority for the Services today should be (1) conducting inventories and correcting property records; (2) creating new records to record all of their real property interests [using the new data standards] in the inventories; and (3) bringing their systems into compliance with the new standards.

b. Place database on web for use by Defense Analysts

Some "keepers" of real property inventory data express concern that providing ready access to analysts is risky because of the inconsistencies between the Services' databases and the complex transformations required for FAD and FSM. Unless an

analyst understands the subtleties embedded in the data, he or she may easily misinterpret the data and reach erroneous conclusions. However, without more exposure (and scrutiny) of the data, this hurdle may never be overcome. Additionally, different functional communities are already spending resources to develop alternate sources of accurate information. The improved analyses will enable Defense leaders to improve management and make decisions entailing less risk for DoD.

Therefore, we recommend ODUSD(I&E) develop and post a web application to provide access to the consolidated real property database after completing the reconfiguration of the FY 2000 inventory to the new data structure. However, this does not mean that all users are granted the same access privileges. Web technology will support and enforce the implementation of user groups assigned different privileges through the same web application. For example, a senior executive may wish to run a standard report to track capital improvements by types of facilities operated by his or her agency. A functional analyst in the same agency may want to examine the capital improvements but do it at a more detailed level to compare to specific budget and program actions. The agency's real property specialist may be granted the authority to access the database directly and create ad hoc reports. When each of these users access the web application they will see only those features and functions permitted to their user group.

Initially, the web application may only provide standard reports and data exports. ODUSD(I&E) can then add data update facilities and query capability using enterprise-reporting tools such as Crystal Decision or Discoverer. Given the nature of the legacy databases, update and query functionality may initially be restricted to trained experts only.

3. ODUSD(I&E), with the Services and Defense Agencies, create a strategic plan for implementing study recommendations

In keeping with the new mission statement, ODUSD(I&E) must continue its drive, using their working groups and panels, to create and enforce data standards and to develop standard methodologies for evaluating and communicating real property requirements. The revised DoDI 4165.14 addresses only the critical data requirements to meet today's immediate needs. DoD needs to look beyond these immediate needs to project and anticipate future requirements. Implementing the recommendations below will:

- Involve the real property accountability community in creating a shared vision with goals and objectives for an accurate, timely and useful real property information system to be implemented in the future;
- Achieve unity of purpose for developing, assessing, prioritizing and resourcing implementation actions; and
- Educate the Services' non-real property officials about the importance of accurate and timely data to their funding and other vested interests.

a. Establish the desired future state for the real property accountability function

Using the strategic perspective presented in this report as a start point, we recommend ODUSD(I&E) establish a panel under the Defense Facilities Strategic Plan Working Group to begin immediately to develop a vision and mission statement for the real property accountability function that looks 5-10 years into the future. The panel should include the Services' and Defense Agencies' real property accountability community, their staff oversight and the users of their data including other DoD functional communities (environment, housing, logistics, operations, etc.). The panel can use the shared mission and vision to complete their strategic perspective by establishing goals and objectives to provide the framework for identifying the implementing actions.

b. Identify expanded real property data requirements, e.g., operational capacity data, to serve the broader Defense community

Once the strategic perspective is approved, we recommend the panel look beyond the critical data requirements published in this year's revision of DoDI 4165.14 to identify the specific functional/business requirements (rules) and data and information requirements and standards to support the goals and objectives. The panel will need to determine the questions that Defense leaders and analysts should be able to answer with the real property data. For example, we believe that technology and data will be available to geographically locate the footprint of Defense real property assets and attributes (see Recommendation 4 below) and associate operational capacity data with this footprint. This is emerging today as a requirement for decision and information support at the OSD level, especially for operational uses.

Budget and Program Objective Memorandum (POM) exhibits require projecting future real property inventories and resultant resource requirements. FSM provides these projections. However, to support FSM, ODUSD(I&E) currently obtains data on projected BRAC, demolition, new construction, housing and transfer actions from separate data calls. Current policy does not require recording planned and programmed new construction in the real property inventory. We recommend the future real property inventory data structure include these.

From these requirements, we recommend a new data model be constructed to describe the revised requirements and standards. This model can be built using the model in Appendix F as a starting point. Upon approval, DoDI 4165.14 should be revised to reflect these new standards.

The new real property data model will provide application developers for the different Defense components and functional communities the technical information they require to access and use existing real property information in their applications instead of attempting to recreate it.

c. Create a strategic plan to identify and fix responsibility for implementation actions

With the strategic perspective and the information requirements established, ODUSD(I&E) can create a strategic plan to identify implementing strategies and actions, required resources, milestones and timelines and can designate the responsible organization for each action item. The milestones should include time-phased implementation for achieving compliance with the new standards. We recognize that modifying the Services' real property databases to meet DoD requirements will impact the applications and interfaces already developed and could take a long period of time to complete all required actions.

The strategic planning process and the implementation plan should also include an assessment of the functions required of real property accountable personnel using the vision and information requirements developed as the basis for identifying these requirements. Once agreement is reached on the future functional work requirements, these requirements can be translated into envisioned work effort and standards to be met by real property accountable personnel. The logical next step will be to compare the current work performed and staffing levels with the established standards. We believe that this functional area assessment and manpower loading analysis will reveal significant staffing shortfalls.

4. ODUSD(I&E) expand the capability of the web-accessible real property inventory database to incorporate a standardized, automated visualization management tool

DoD today requires data to document real property operational capabilities and capacities and to project the operational requirements for and capabilities of our installations and their real property assets. This will require data and information beyond the standard inventory data discussed above to include GIS data, imagery, and expanded operational capacity and capability data.

Therefore, we recommend ODUSD(I&E) expand the capability of the web-accessible real property inventory database described in Recommendation 2 above to incorporate a standardized, automated visualization management tool that integrates the real property inventory data with selected GIS, imagery and new operational capacity data to support current and to project future Service and Joint installation management capabilities and requirements. This recommendation greatly expands the scope of interest beyond the real property accountability community to the military operations, environmental, and range management communities. Implementing this recommendation will:

- Provide a standardized visual installation management tool to support current and projected future installation management requirements;
- Provide a baseline platform system to enhance and/or add capabilities consistent with current and emerging installation management requirements; and

- Enable integrating enhanced real property inventory data with selected GIS overlay and imagery information.

a. Survey on-going GIS and imagery efforts and existing capabilities and information within DoD

The Services and other DoD organizations have employed GIS systems and developed GIS data and imagery for almost two decades. Some installations have sophisticated GIS systems that incorporate aerial images and cross-functional databases. The environmental and range management communities are actively expanding their GIS capabilities. However, these efforts are often uncoordinated and, in some instances, duplicative of prior work or capabilities already available from outside sources. The Army recently sent out a survey to their installations to identify the extent of the GIS capabilities and data development. We recommend ODUSD(I&E) conduct a similar survey across DoD.

b. Establish a DoD working group to develop policy, standards and data definitions for the GIS, imagery and new operational capacity data

In the 1990s, the Tri-Service CADD/GIS Technology Center was charted by the United States Army Corps of Engineers, the Naval Facilities Engineering Command and the Civil Engineer of the Air Force to promote CADD/GIS data standards. Today, this center has been renamed the CADD/GIS Technology Center for Facilities, Infrastructure and Environment and is established to coordinate and promote CADD/GIS and Facilities Management Technology applications. The Center is located at the U.S. Army Engineer Research and Development Center, Information Technology Laboratory, Vicksburg, Mississippi. The center has issued some CADD/GIS data standards. However, neither the Services nor OSD has established any requirements for creating and maintaining GIS data and imagery. Many installations have no or minimal GIS capability.

Each command, functional area and/or local commander has resourced his/her own requirements as funds have been made available using a variety of systems and standards. The standards developed by the CADD/GIS Technology Center have not been enforced. To support OSD-level analysis, selected GIS data must be available from all installations and capable of being incorporated into a standard system.

Additionally, the current real property inventory does not capture sufficient information to evaluate the capacity and capability of DoD's real property to support operations.

Therefore, we recommend DUSD(I&E) create a DoD working group to develop policy, standards and data definitions for the GIS, imagery and new operational capacity data. This effort will impact the work performed in Recommendation 3 above to create a strategic plan.

c. Develop a web-based, automated visualization capability using commercial off-the the-shelf (COTS) GIS and relational database software

Based on standards and requirements defined by the DoD working group in 4b above, we recommend ODUSD(I&E) develop a web-based, automated visualization capability using commercial off-the the-shelf (COTS) GIS and relational database software to integrate real property inventory information with selected GIS, imagery and operational capacity data. This recommendation is an expansion of Recommendation 2 to create a web-based real property inventory database. This combination will create the initial nucleus of an installation management system with the capability to generate current and project potential future GIS overlays depicting capacities, capabilities, and limitations of installations and facilities applicable to decision making at headquarters' levels.

d. Collect baseline GIS, imagery and operational capacity data

As noted earlier, some installations already possess a significant amount of GIS and imagery information. In addition, outside organizations have already developed some of the information and images that will be required to populate the information management system. Nevertheless, we anticipate a significant shortfall in the amount and quality of information in existence. To support OSD-level analysis, the desired data must be available from all installations. Therefore, the data requirements will have to be prioritized to focus the data creation and collection effort and centrally coordinated to ensure resources are leverage to prevent duplicating on-going efforts. Also, GIS and imagery data is perishable, and, like the inventory data, must be maintained current. We suggest GIS data be locally updated on an annual basis and imagery data on a 3-5 year cycle.

5. OSD and the Services program and budget resources to implement the plan

OSD leadership can signal their support of this effort by providing the resources and backing to implement the plan. In this study and our recommendations, we envision ODUSD(I&E) creating the equivalent of a real property data utility for DoD. This utility is a "public good." Its creation and maintenance will benefit many Defense organizations and functional communities by reducing the time, effort and dollars required to obtain, maintain and use accurate, current real property information. We believe it would be unfair to require the Services to bear the total burden for transforming their databases and applications when all Defense analysts and organizations using real property data will benefit. Implementing this recommendation will:

- Provide tangible evidence of the importance to DoD leadership of accurate, timely real property data; and
- Establish credibility with headquarters and local staff responsible for maintaining data.

6. ODUSD(I&E), with the Services and Defense Agencies, implement an incentive program

Data standardization and easy access to the data will have a direct impact on motivating local activities to maintain higher quality data. The more visible and accessible real property data becomes, the more scrutiny the data will receive, and analysts using the data will identify the more shortcomings. When real property accountable personnel and their commanders realize the rest of the Defense community is seeing and using their data for analyses and decision support, they will become more motivated to maintain up-to-date and accurate records. The bad data will be worked out of the system reducing the resources currently used to overcome the limitations to enable effective analysis. While the quality of real property data as seen from the Service headquarters level is improving, government audits, our interviews and our recent field experience find that changes in the inventory are not being made on a timely basis, that physical inventories of real property are not being consistently performed and that existing records still have inaccuracies not detectable by headquarters' quality assurance and control reviews. Implementing the recommendations below will:

- Verify the quality of source data to improve confidence in analyses using the data;
- Provide early warning of "bad" data to facilitate timely correction; and
- Provide motivation for real property accountable personnel to maintain up-to-date, complete and accurate records.

a. Establish data quality standards

How do you define "accurate?" What does "quality" mean with respect to real property inventory data? How much determines "good enough?" How much will it cost to achieve and/or measure a specific quality standard? These are all important issues to address when establishing quality standards. For example, assume the consolidated database contains 1 million records. To measure with 95% confidence that the true error rate is within a range of +/- 1% requires a random sample size of 9,513 records; within +/- 2% requires a sample of 2,395 records. To measure with 90% confidence +/- 1% requires a sample of 6,760 records; +/- 2% requires 1,699 records.

The DoD IG reported that the real property databases used for the FY 1998 financial statements "contained sufficiently accurate inventories of real property with values greater than $100,000. Sampling results showed that, at the 90 percent confidence level, the Military Departments had less than a 5% error rate for unaccounted items. This error level and confidence level are sufficient for information supporting the financial statements because management decisions are not based on these statements. On the other hand, Service, Agency and staff analysts are developing new methodologies to assess Defense requirements and performance (including real property) and to allocate resources. These new methodologies require greater accuracy and much more timely information than current systems provide. Consequently, we recommend an objective be established for the real property records to be maintained with less than 1% errors for

completeness and existence and for accuracy in the critical data elements driving analytic methodologies.

The next step is to determine the data against which this standard will be applied. As a strategy for improving data quality, we recommended in 1b above ODUSD(I&E) identify the most critical data elements on which to focus improvement efforts before moving down the list to tighten up less critical data. For example, we recommend that the focus be on the accuracy of data elements that drive most analyses: facility value and quantities within FACs for the population from which the sample is drawn. This does not mean applied against the number of records but applied to the quantities measuring area, volume, size, length, etc. For example, a sample drawn from a FAC with 10,000 records with 5% of those records with errors is interesting, but if these errors resulted in only a 1% deviation from the total measured quantity or value of the sampled population, this error would be acceptable.

Another significant problem is recording new acquisitions in property records. We recommend that for each installation visited, the auditor/reviewer verify the creation and accuracy of the record for each new facility placed in service. The acceptable omission level at the local level may be zero, but, for the service as a whole, it should be less than 1%. Timeliness is also important. New facilities should be entered into the inventory and capitalized within 90 days of occupancy or before the end of the fiscal year, whichever is earlier.

b. Continue audits and emphasize performance of physical inventories

Formal audits of real property records will continue to play a strong role in providing incentives to achieve and maintain accurate records. The key to future success will be the enforcement of the established data standards. This enforcement will require continued attention from Defense staff and from the Services' audit and internal review communities.

ODUSD(I&E) should work with DoDIG to establish an annual program to verify the accuracy and completeness of the essential real property data. The reviewer should extract a statistically valid sample of real property records from OSD's consolidated database, validate that, at a minimum, the most critical data have been completed, and conduct site visits to check the accuracy of this data against the source data record and the real property itself. The auditor/reviewer should also determine whether physical inventories of real property are being performed and documented in accordance with DoD regulations.

c. Provide both personal recognition and tangible rewards for maintaining accurate records

DoD should not rely entirely on its audit program and negative incentives to achieve its quality goals. Positive incentives for the maintenance of accurate data can also

play a key role in motivating accountable personnel to be diligent. Early compliance with the standards should be rewarded through incentives. The first step is to communicate the requirements and importance of maintaining up-to-date and accurate real property records.

To encourage maintenance of quality records, we recommend ODUSD(I&E) , with the help of the Services and Defense Agencies, initiate the following:

- Provide the name and/or organization and phone number of the accountable officials for each real property record so data users can contact them to resolve data issues.
- Provide letters of recognition from senior DoD officials, plaques and/or monetary bonuses to accountable officials and/or their organizations for exceeding quality standards.
- Publish unresolved data issues or known problems along with the names and organizations of responsible officials.
- Provide a mechanism for inaccurate data to be challenged by tenants

7. ODUSD(I&E) be proactive in responding to other functionals' data requirements

Many organizations outside the base engineering communities require real property data to manage their operations. In our strategic perspective, we emphasize the importance of including these communities in developing data requirements and being responsive to their requirements. Also, these organizations have also collected and are maintaining real property data that is potentially useful to others. Therefore, by including them in this effort, DoD will be able to leverage their investments to the benefit of others. For example, the environmental and fire prevention communities maintain databases to track hazardous conditions and materials associated with real property sites and facilities. If other functional communities agree to use the same standard values for key real property data elements used in their databases, they will create an opportunity for sharing data between the databases. The shared data need only be maintained in the one database of record. Implementing the recommendations below will:

- Leverage resources already expended to collect data;
- Reduce costs for collecting and accessing data across the Department, while encouraging collaboration;
- Further enforce standards and ensure consistency of use and understanding; and
- Reduce opportunity for errors, underreporting, or duplicate records.

a. Provide open access to targeted DoD real property data at all levels of organization

This recommendation extends beyond providing access to a consolidated DoD inventory maintained in a single location. Not all real property data can or should be stored in a single location. Many installations have created large GIS and CAD databases. Other functional communities may be creating other real property databases that contain data elements useful to other Defense analysts. This will leverage the investment made by one organization to expand the overall benefits gained by DoD. For example, by making CAD and GIS files created by an installation accessible throughout DoD, other organizations such as JCS or DLA will not have to recreate them at additional cost to fulfill their information needs. If this data has significant value for others, we recommend OSD resource the cost of providing access through ODUSD(I&E)'s web site.

b. Assign proponency for data elements shared across functional communities

Once OSD determines that a real property data element should be treated as a Defense corporate asset and made available across DoD, we recommend OSD assign proponency and responsibility in DoDI 4165.14 for maintaining that data element and associated data. Since we are recommending a shared database, we are also proposing shared responsibility across functional boundaries and at different organizational levels. The source creating and originating the data should ultimately be responsible for its upkeep.

c. Establish the ODUSD(I&E) consolidated real property database as DoD official corporate database of record

After ODUSD(I&E) is successful in establishing a web site with the consolidated real property database, has a process to refresh the data within a reasonable period, and has an application that provides ready access to analysts across DoD, we recommend OSD designate this consolidated real property database as the official DoD corporate real property database of record. This is a critical step in standardizing real property data and establishing consistent analysis and use of the data. All analyses and reporting performed at Defense component level and higher and for external DoD reporting would be required to use data drawn from this database.

8. ODUSD(I&E) continue to develop and field standard real property analytic tools

In the past, Defense analysts and decision makers have not had the real property data they require to develop credible analyses to articulate the long-term impact of under-resourcing facility sustainment and recapitalization. Consequently, Defense decision makers have felt more comfortable than they probably should in diverting resources from real property accounts to modernization. In addition, Service, Agency and Defense

decision makers are requiring greater accuracy and much more timely information than current systems provide to respond to requests from Congress and to support competitive sourcing, privatization and other new initiatives.

OSD must combine credible data with the development of credible methodologies for performing analyses. This will require ODUSD(I&E) to continue their development of standard methods for calculating and evaluating real property requirements. Implementing the recommendations below will:

- Encourage consistency in analysis;
- Project impact of resource trends on real property;
- Enable effective risk assessments and decision making; and
- Reduce the Services' need to independently develop reporting methodologies.

a. Continue Refining the Facility Sustainment Model

The FSM uses the FAD inventory data and sustainment cost factors from the *Handbook* to estimate and project the costs to sustain Defense facilities. However, FAD data must be normalized and changes in the real property inventory projected. The proposed critical standard data requirements will provide most of the information required to produce FSM except for new construction. We recommend that ODUSD(I&E) expand the required standard data elements and DoD consolidated inventory to include projected new construction and projected new acquisitions (see Recommendation 3b above).

b. Standardize the calculation for Plant Replacement Value (PRV)

The Services still use different methods to calculate PRV. One of the objections to using the ODUSD(I&E) calculation for PRV is that it uses the same multiplier of 1.2 for all FACs to estimate the supervision, inspection, overhead and design costs for construction. We recommend ODUSD(I&E), the Services and Defense Agencies together re-evaluate whether a single multiplier is adequate. While a single multiplier may be appropriate for a large percentage of the FACs, some FACs may have significantly different costs in this area. For example, we would expect the multiplier for storage facilities or training ranges to be lower than for Research, Development, Test, & Evaluation (RDT&E) facilities. We suggest conducting a study of DoD construction project costs to explore this issue. We also recommend PRV be added as a calculated field to the real property inventory (see Recommendation 3b above).

c. Add an "Adjusted Year Built" field to the inventory database

The current inventories and the proposed critical standard data elements provide only the original date a facility was built. Therefore, a building constructed in 1890 and entirely rebuilt in 1990 except for its basic structural members is reflected as an 1890

building in the inventory. This weakness makes it difficult to project recapitalization requirements and the effective age of Defense facilities. We recommend an "Adjusted Year Built" field be added to the required standard data elements (see Recommendation 3b above). In addition, DoD will need to develop rules for calculating this field and may consider making it a calculated field in the database derived from recapitalization expenditures and dates.

B. Long-Term

For the short-term, we have recommended ODUSD(I&E) take the lead to create a plan, establish standards, set implementation milestones for compliance with new reporting requirements, provide access to real property data, and continue promoting standard analytic tools. For the long-term (3-5 years), our recommendations will swing the pendulum toward the Services and participating functional managers to implement the plan. During this time frame, ODUSD(I&E) should manage a cultural change to a common real property language as well as monitoring progress toward modification of existing information systems. [Note that for ease of future reference we have continued the numbering of recommendations from the Short-Term above.]

9. The Services incorporate the new data standards into their existing information systems including their GIS systems

The Services' real property inventory systems must either be modified to incorporate the new terminology, definitions and values specified in the revised DoDI 4165.14 or OSD resource a rapid build of a new system for DoD-wide use (see recommendation 10 below], and the Services accept the new DoD system and incorporate this system into their overall information systems architecture. We recommend the Services take the later approach: eliminate their service-unique real property modules/systems with their real property inventory systems and divert the resources supporting those capabilities to modifying other systems requiring real property data to enable them to link to the DoD system and use the new real property inventory system and data. The Services should solicit participation from their wider functional communities having an interest in real property data and use the DoD data model as a baseline for building Service-level shared data models and for expanding the DoD model and proposed system to include additional information needed by local management. In addition, existing GIS systems must support the requirements established by the DoD working group (see Recommendation 4 above). The Services should use the strategic plan (see Recommendation 3 above) to shape any changes proposed for their applications and interfaces. In addition, ODUSD(I&E) must work with the Services to ensure the DoD system meets the real property inventory management requirements at the user level. Implementing the recommendations below will:

- Enable the Services' and Defense Agencies' data to be shared across DoD and with other systems without transformation;

- Create a predictable, comprehensible process for real property system changes allowing for the identification of costs and fixing responsibility for resourcing the costs;
- Reduce the requirements and costs to build new interfaces;
- Create the potential for sharing/reusing applications across DoD, thus reducing system development and data transfer costs; and
- Enable imagery updates to maintain relevance of GIS visualization.

a. Transform Service and Agency databases and applications to conform to the new standards

All DoD databases using real property inventory data will require some modification. At a minimum, they will need to adjust to the revised data definitions and codes required by the draft DoDI. Ideally, these databases should be redesigned to be consistent with the DoD data model, and the applications redesigned to enforce the use of standardized valid codes and values. Also, the Services currently record more inventory data in greater detail then required by DoDI 4165.14 to support Service and business unique requirements. In coordination with subordinate organizations and interested functionals, Services should add to and enhance the DoD model and system to ensure it meets the full range of Service, DoD and functional information requirements. The same requirements will apply for the selected GIS and imagery data. Once the model is validated across the Service's user community, each application connected to the database must be evaluated to identify data entry and retrieval functions that must be realigned with the new database. In addition, all existing interfaces should be evaluated to determine the impact of changing the real property database. As part of the interface review, data should be mapped between each system sharing real property data, determine the modification required, and update (or create) a formal interface agreement. For the agreement, one and only one functional community should be assigned source data entry and maintenance responsibility for a data element, with particular emphasis on data shared across communities. The interface agreements will instill confidence that the different communities are using and interpreting data the same way.

b. Continue to emphasize conducting physical inventories and updating real property inventory, GIS, imagery and operational data

Technology and systems alone cannot resolve all of the problems with current real property information in DoD. At present, the biggest concern facing the Real Property community is data quality. The short-term recommendations address improving data quality mainly by promulgating and enforcing data standards, but, to achieve the goal of providing analyses credible with Defense and federal leadership, data quality must be routinely measured and validated as accurate over the long term. At the local level, real property accountable personnel must ensure physical inventories are performed and properly documented to compare the actual facilities and records with the data recorded in the real property inventory.

The maintenance of up-to-date records is also critical. Real property data will probably have to be updated on a nearly continuous basis (at least monthly) to meet financial reporting requirements. Selected GIS and operational data related to real property will have to be updated at least annually. Imagery data will require refreshment on a 3-5 year cycle to support GIS visualization of the real property inventory and related physical and operational capacity data.

10. ODUSD(I&E) build a new DoD-wide real property-related installation management system

Today, DoD has four systems generating "official" real property inventory information. Therefore, a Defense-wide change made in real property inventory data will require updates be made to all of the systems and, in turn, to all of the interfaces using this data and linked into these systems. In addition, there are other functional systems using and generating real property information that are not electronically linked to the real property inventories. If DoD creates a single real property system, fewer interfaces will be required and accessibility to real property information will be improved.

Several cautions are required before we proceed: there will inevitably be a group of well-intended managers who are over zealous and want to use the latest and greatest technology to consolidate data and make it more accessible. The reality is that, at some point in the consolidation process, the great debate will ensue over whose definition is correct, what data should be included, how codes should be configured, or what the real standard should be. To engage in this debate in the middle of a software project is counterproductive and will usually lead to the demise of the project altogether. The current FAD provides a good example of the barriers that must be overcome before moving to a single database. In spite of all the effort put into data conversions and transformations, the real property data in FAD remains in three separate sets of non-standard tables reflecting the differences among the services. This is precisely the reason we propose establishing standards and pursuing a cultural change as a precondition for consolidating service data into a single virtual Real Property database. Migration to a single database is substantially easier, and less costly, if all the data sources are built to the same data standards. Only after data standards have been established, conveyed to the user community, and internalized and accepted through cultural change, does it make sense to expend resources on migration to a single DoD-Wide database.

Although the corporate real property database will be centralized, the Military Departments and WHS will retain their "ownership" responsibilities including maintenance of accurate, up-to-date inventory data and records. The single DoD system can be designed to enforce data standards through the use of edit tables and business rules embedded in both the database and the application. Real property accountable officers and offices with data oversight responsibilities can be granted appropriate access to the "live" database. Local base engineer organizations using systems such as ACES and IFS could dynamically link to the "live" database and use it as part of the local system. For example, when creating a repair work order, the user would enter the facility number, and

the local system would retrieve the other facility information for the form from the "live" database. The user would fill out the other repair information, which would then be stored in the local work order management system. For analytic and reporting purposes, Defense analysts will not want "live" data because it constantly changes. For these users, a data warehouse can be created from the corporate database, which contains the "official" position of the data at a specific point in time such as the end of the fiscal year. By using a web-enabled enterprise reporting tool (e.g., Crystal Decision or Discoverer), users' access to the inventory information can be managed according to their need and skill level. Some users may be granted access to canned reports only while others may be granted privileges to create ad hoc reports.

Implementing the recommendations below will:

- Minimize maintenance costs and the number of interfaces by leveraging technology and reducing redundancy;
- Significantly reduce the software modification lifecycle and enable the real property system to be responsive to changes in real property business requirements;
- Provide Services, Agencies and staff with a consistent real-time view of the entire real property business area and a standard installation visualization platform for current and future Joint and Service installation management requirements; and
- Improve the usability of information, promote wider use, and leverage current resources to further reduce long-term system and analytic costs.

Proceed with Caution!

Only after data standards have been established, conveyed to the user community, and internalized and accepted through cultural change, will it make sense to expend resources on migration to a single DoD-wide database.

a. Develop a single virtual multi-layer, cross-organization integrated and shared database

Within five years, technology will enable all DoD real property inventory records to be readily maintained in a single, virtual, central database. Although physical collocation of all data is preferred, it is not essential to physically move data to engineer it as a single virtual entity. Assuming information standards described above are implemented in the Services' databases, it will be feasible to build a system that will access the data where it lies to perform the task requested, yet it will appear to the user to be a single database. For example, OSD staff will be able to access from their desktops geo-spatial data resident at Defense installations. Real property accountable personnel can have real-time access to the DoD database to both maintain their inventory and retrieve information as needed. (See Figure 5.)

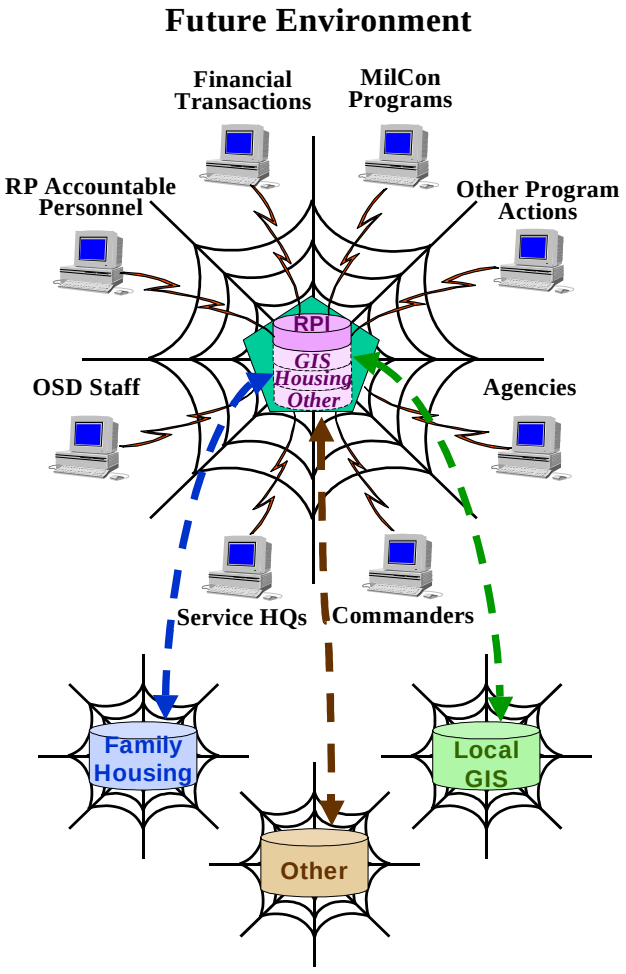


Figure 5

b. Build function-specific applications for entering data into and retrieving information from corporate database

By building the shared corporate database independent of specific application requirement (e.g., Defense financial systems, maintenance management software), DoD virtual real property database can serve many masters. Any number of applications may be built to interact with the corporate database, each designed to support specific functions. Some applications can be engineered to include responsibility for data maintenance, while other applications can exist solely to retrieve information in a specific format for a specific functional community. Functional community unique information can coexist in the shared database even if used by only a handful of users as long as the

corporate shared data is not modified in any way. Business rules for the data itself, including allowable values and enforced relationships, should be engineered into the database. However, rules for interacting with the data, such as sequencing of actions and navigation options, may be enforced by the application as seen from the perspective of a functional community. The application simply governs the way users update the database or retrieve the information.

c. Provide real-time, online, remote access using the latest technology including enterprise reporting, voice and video technology, and enhanced GIS and imagery capabilities

The separation of data from applications allows developers to use many different technologies to interface with the corporate database. This separation facilitates the use of cost efficient COTS products to interact with the data, such as enterprise reporting, statistical analysis tools, and GIS. It also makes the use of web technology feasible by allowing the web application to live on a web server independent of the data it is accessing. The web application provides a middle tier between the client using a browser on a desktop computer and the database that can be in any flavor and not necessarily collocated with the application server. Web technology provides the entire user community with real-time, online, remote access through a single application to a single virtual corporate database while minimizing the bandwidth requirements between the application server and the desktop computer. Introducing voice and video for communicating with end users can greatly enrich web applications. Although bandwidth may currently inhibit voice and video performance over the Internet, an enormous investment is being made to increase this capacity and should therefore be considered only a temporary shortfall.

d. Engineer into systems the quality edits and audits needed to ensure accuracy

Quality assurance and quality control are often taken for granted when designing a software application. In the final analysis, if a management information system does not contain accurate, reliable, complete and pertinent information, it will quickly become irrelevant and be replaced with a manual work around. If we think of an application as an input/output device, then quality assurance is directed at the process of entering data into the database. There is a great deal that can be done through the application to control the process of entering data to ensure quality; but quality considerations must be identified and prioritized during the software design phase before they can be engineered into the application. The most common and most powerful technique is the liberal use of reference/edit tables to drive “pick” lists from which only valid values may be selected. In and of itself, a pick list does not prevent a user from selecting an incorrect value, but it will significantly reduce the number of possible incorrect choices. Pick lists also provide a great way to enforce data standards. Invalid combinations of values can be trapped and disallowed at the point of entry, further ensuring the quality of the data. Data entry screens can be designed to enforce a predetermined sequence of steps resulting in a

standard process for entering data. Choices made in earlier steps may further restrict choices available in later steps. By controlling the process, an application can disallow invalid entries, but it can do very little to ensure overall accuracy.

There will always be a need to check the results after the fact. Quality control is oriented toward evaluating the quality of the product itself. The populated database is the product, and an audit report is one form of quality control. Deciding what to check can pose a significant challenge, but once the decision is made, audits can be created which provide a window into the quality of the data. Any data validity checks not enforced at the point of entry can be evaluated after the fact as a quality control check. At time of data entry, many checks can be made on an individual record, but only after all data is entered does it make sense to make checks on the aggregate set of records. Analysts can often identify irregularities by plotting the data. A common quality control technique is to compare totals, counts, or sums with known or expected results. Inconsistencies can be flagged for further analysis and resolution. Sample data may be extracted and compared with the physical item it is supposed to represent. Physical inventory results can be compared with the database content to identify errors and omissions. Ultimately, any and all efforts directed toward improving data quality and integrity will pay high dividends when the information is provided to managers to justify program and budget decisions.

V. Resources Required for Implementation

The tasking for this study included providing "a detailed statement of resources necessary to implement any [system] changes that may be required." In this section, we will explicitly identify estimated costs for implementing the system changes recommended in Section IV. However, there is another set of costs that must not be ignored but which require further development: the overall staffing levels required to perform the real property inventory and accountability functions and to maintain GIS, imagery and operational data. These costs will be discussed at the end of this section.

A. Inventory System Modernization Costs

The purpose of the recommendations in this study is to develop a system enabling DoD to capture and access the consistent, accurate, up-to-date information required for reporting and decision support. The cost estimates presented in this part are directly tied to creating the information infrastructure required to stand-up and maintain a DoD-wide real property inventory system.

All estimates represent new requirements for FY 2001 through FY 2004. Recommendation 3b calls for a broad-based needs assessment to identify the expanded information and data requirements to support defense decision making. The cost estimates developed in this section will change based on the specific information requirements identified during this needs assessment.

The first table, Implementation Costs by Study Recommendation, identifies the estimated costs for implementing each recommendation from Section IV and splits the costs between one-time and recurring costs. The overlap between some recommendations is noted in the table. Note that the costs for implementing recommendation 9b are discussed in the last part of this section.

Table V-1

Implementation Costs by Study Recommendation (FY 2001-FY 2004)

Study Recommendation	One-Time Costs	Recurring Costs	Total Cost
1a. Establish clear policy for real property accountability	**Included in Tasks 3b & 4b**		
1b. Identify and confirm critical real property inventory data requirements	$403,000	$0	$403,000
1c. Publish and publicize the revised DoDI 4165.14 this year with an implementation date of September 30, 2002	$1,783,000	$108,000	$1,891,000
2a. Migrate the existing OD(PA&E) real property data into a new database	$467,000	$0	$467,000

Table V-1

Implementation Costs by Study Recommendation (FY 2001-FY 2004)

Study Recommendation	One-Time Costs	Recurring Costs	Total Cost
2b. Place database on web for use by Defense Analysts	$2,168,000	$280,000	$2,448,000
3a. Establish the desired future state for the real property accountability function	$13,000	$0	$13,000
3b. Identify expanded real property data requirements, e.g., operational capacity data, to serve the broader Defense community	$854,000	$0	$854,000
3c. Create a strategic plan to identify and fix responsibility for implementation actions	$89,000	$0	$89,000
4a. Survey on-going GIS and imagery efforts and existing capability and information	$427,000	$0	$427,000
4b. Establish DoD working group to develop policy, standards and data definitions for GIS, imagery, and operational capacity	$152,000	$0	$152,000
4c. Develop a web-based visualization capability using COTS	$3,005,000	$9,900,000	$12,905,000
4d. Collect baseline GIS, imagery and operational capacity data	$11,760,000	$0	$11,760,000
5. OSD and Services program and budget resources to implement the plan	**No added cost**		
6a. Establish data quality standards	**No added cost**		
6b. Continue audits and emphasize performance of physical inventories	$0	$1,584,000	$1,584,000
6c. Provide both personal recognition and tangible rewards for maintaining accurate records	$0	$50,000	$50,000
7a. Provide open access to targeted DoD real property data at all levels of organization	**Included in Tasks 3b & 4c**		
7b. Assign proponency for data elements shared across functional communities	**No added cost**		
7c. Establish the ODUSD(I&E) consolidated real property database as the DoD official corporate database of record	**No added cost**		
8a. Continue Refining the Facility Sustainment Model	**Included in Task 3b**		
8b. Standardize the calculation for Plant Replacement Value (PRV)	$72,000	$0	$72,000
8c. Add an "Adjusted Year Built" field to the inventory database	**Included in Task 3b**		

Table V-1
Implementation Costs by Study Recommendation (FY 2001-FY 2004)

Study Recommendation	One-Time Costs	Recurring Costs	Total Cost
9a. Transform Service and Agency databases and applications to conform to the new standards	$7,793,000	$0	$7,793,000
9b. Continue to emphasize conducting physical inventories	**Discussed in Section B below**		
10a. Develop a single virtual multi-layer, cross-organization integrated and shared database	$1,873,000	$1,706,000	$3,579,000
10b. Build function-specific applications for entering data into and retrieving information from corporate database	**Included in Task 10a**		
10c. Provide real-time, online, remote access using the latest technology including enterprise reporting, voice and video technology	**Included in Task 10a**		
10d. Engineer into system the quality edits and audits needed to ensure accuracy	$252,000	$0	$252,000
Total	**$31,111,000**	**$13,628,000**	**$44,739,000**

Over half of the estimated costs are associated with expanding DoD's capability to link GIS, imagery and operational data (recommendation 4) to installations and the real property inventory. We estimate that it will cost about $13.3 million to convert from the current Military Departments' systems to a single system (recommendations 1c, 9a, 10a and 10d) and to retrain the workforce to the proposed DoD standards and system. Of the remaining $6 million, we recommend $1.6 million be devoted to resourcing a dedicated audit function (2 full-time equivalent (FTE) positions) in each of the Service audit agencies and for the DoDIG and Defense Agencies. The remaining $4.4 million is proposed for developing standards and requirements and providing web accessibility to all the real property inventory information.

Table V-2 displays implementation costs by fiscal year and again segregates these costs into one-time costs and recurring costs.

Table V-2
Implementation Costs by Fiscal Year

Cost Category	FY 01	FY 02	FY 03	FY 04	Total
One-time costs	$3,999,000	$17,281,000	$8,266,000	$1,565,000	$31,111,000
Recurring Costs	$0	$96,000	$6,741,000	$6,791,000	$13,628,000
Total	**$3,999,000**	**$17,377,000**	**$15,007,000**	**$8,356,000**	**$44,739,000**

We recommend OSD begin immediately the strategic planning and requirements definition work for the whole implementation effort to include collecting existing data to support new information requirements. Any delays in starting this essential planning work will ripple through the follow-on system development effort. The FY 2001 resources will support this quick start and take advantage of the momentum created from conducting this study and from developing and staffing draft DoDI 4165.14. The quick start will also signal to the DoD community the importance of this effort to OSD leadership.

In FY 2002, ODUSD(I&E) will complete the initial collection of the required real property, GIS, imagery and operational data and will develop a visualization tool for use by DoD decision makers. ODUSD(I&E) will also create a web-based real property inventory from the existing databases and develop a single inventory system for use throughout DoD. The Military Departments will focus their efforts on complying with the proposed information requirements and new data standards and on educating their real property accountability personnel on implementing the new standards and requirements.

In FY 2003, the focus shifts to implementing the envisioned long-term environment where ODUSD(I&E) fields a single virtual, multi-layer, cross-organization, integrated and shared database including a single DoD real property inventory system, the Military Departments and Agencies identify the changes and interfaces required for their functional systems to interoperate with the new database, and ODUSD(I&E) begins creation of these new interfaces. The success of the entire effort is dependent on creating interfaces with the new consolidated real property system. Therefore, we recommend resources be provided to ODUSD(I&E) to work with the Military Departments and Agencies to develop an initial set of interfaces to ensure success. For FY 2003, nearly $5 million are included to maintain the currency of the GIS, imagery, and operational data.

In FY 2004, with the new system fielded, ODUSD(I&E) and the Services and Agencies focus on completing interfaces between the new system and other systems sharing or requiring real property data. The long-term sustaining costs consist of dedicated auditing

support and incentives to maintain accurate data ($0.8 million) and sustaining the single integrated real property system ($1 million) and maintaining the currency of the GIS, imagery, and operational data ($5 million).

Table V-3 displays the breakout of estimated costs between the implementing responsible organizations.

Table V-3
Implementation Costs by Responsible Organization

Cost Category	Army	Navy	AF	OSD**	DLA	DASD(HA)	DoDIG	Total
One-time costs	$4,500,000	$2,203,000	$2,475,000	$21,333,000	$100,000	$500,000	$0	$31,111,000
Recurring Costs	$1,196,000	$1,196,000	$1,196,000	$9,144,000	$349,000	$349,000	$198,000	$13,628,000
Total	**$5,696,000**	**$3,399,000**	**$3,671,000**	**$30,477,000**	**$449,000**	**$849,000**	**$198,000**	**$44,739,000**

**Note: OSD's One-time costs include developing interfaces between the single DoD system and other functional systems including those for Agencies.

We estimate the Army will incur significantly greater costs than the Navy and Air Force because their IFS system is very mature, deployed to installation level, and linked with numerous other Army systems. Therefore, changes in IFS will require altering more internal Army interfaces. The Air Force and Navy systems are centrally maintained and have far fewer such interfaces. The Defense Agencies are not listed, but the costs assigned to OSD include resources to develop interfaces between their systems and the proposed DoD system. Because DLA and DASD(HA) both resource installation operations, we have included in the recurring costs some funds to support maintenance of the expanded data requirements in recommendation 4 and some funds to cover the transition to the DoD-wide system in recommendation 10. Also, note that the recurring costs for the DoDIG are for an enhanced audit function proposed in recommendation 6b.

B. Functional Area Staffing Requirements

Based on information provided by some of the Agencies and Military Departments, current real property staffing levels may be inadequate to effectively comply with current regulatory requirements. However, we did not have sufficient time to perform what should be a functional area assessment and manpower requirements study for real property accountability. The basis for determining these requirements should be addressed during the development of the needs assessment, vision and strategic and implementation plans in recommendations 3a, 3b, and 3c. Once agreement is reached on the future requirements, these requirements can be translated into envisioned work effort and standards to be met by real property accountable personnel. At the same time, the current staffing levels, along with the work and functions performed, must be documented.

We believe that staffing levels probably are inadequate to meet current and projected requirements. The proposed data requirements identified in the draft DoDI will require

all real property "interests" to be captured in real property inventories and also to provide a condition assessment for each facility. Physical inventories between real property data and records are often not performed as required by DoD regulations (addressed by recommendation 9b, continue to emphasize conducting physical inventories). One of the Services indicated that 5-year boundary surveys are required but not performed with regularity. These all suggest a potentially serious resource shortfall.

The example presented by the Air Force provides some insight into the size of this shortfall. They currently have over 250 authorizations for real property accountable positions but have filled less than 200 positions. Using the assumption that the average annual budget cost for one FTE averages $60,000, the estimated shortfall for the Air Force is over $3 million annually. If maintaining all real property "interests" and conducting recurring surveys, physical inventories, and facility assessments are added into this workload, the work requirements could increase 25% to 40%. The additional requirements to maintain GIS, imagery and operational information generate additional undetermined requirements. This suggests that the actual shortfall for the Air Force could be another $3-7 million annually. The Army and the Navy may face similar conditions. Additionally, the real property support specialists in the Defense medical activities also estimate they have a significant shortfall ($3-5 million) in meeting the projected requirements. Therefore, it is conceivable that the true added annual cost for maintaining timely and accurate real property information for DoD reporting and decision analysis is about $20-40 million above the projected $6.8 million required to sustain the new requirements.

VI. Conclusion

The entire Defense community will greatly benefit by moving to the recommended new operating environment and system. The recommendations are designed to refocus and leverage the resources that are currently expended to create significantly more value for a wider DoD audience. The recommendations also will bring the real property accountability community into compliance with Defense policy for accounting for real property, establishing data standards for application across DoD, and migrating legacy information systems to a DoD standard system that facilitates sharing information with other systems and users.

The long-term recommendations cannot be achieved, however, without the cooperation of the Services, Agencies and OSD. Only after data standards have been established, conveyed to the user community, and internalized through cultural change, will it make sense to expend resources on migration to a single DoD-wide database.

The new real property inventory system proposed for DoD-wide use does not relieve the Military Departments and WHS of their responsibility for maintaining real property inventory records. The proposed system's controls can be designed to give these organizations full control of and responsibility for entering and maintaining the inventory data.

We recognize that DoD faces significant challenges in implementing the recommendations. These include:

- Unresourced initial costs for implementation;
- Resistance to change;
- Maintenance and operation of legacy systems during the transition to the new system.

Nevertheless, DoD will gain very substantial benefits for their efforts. These advantages include:

- More accurate data faster enabling more uses of data as a resource predictor;
- Shared community-wide interest in meeting users' data requirements;
- Improved opportunity for analyses and more confident decision making;
- Expanded access to and use of geo-spatial data that is inherently costly to develop but valuable to DoD organizations beyond the sponsoring organization;
- Capability to visually link real property inventory data with GIS, imagery, and operational capabilities;
- Readily understood and accessible data;
- Significantly reduced number of out-of-cycle data calls and data requests made to the Services and real property accountable personnel, thereby freeing resources to maintain accurate records;
- Reduced long-term costs;

- Reduced number of systems and interfaces to develop and maintain;
- Responsibility shifted to a single source, ODUSD(I&E), for providing access to real property installation management data;
- Maintenance of legacy systems during the transition to the new system; and
- Under-resourced real property offices.

Nevertheless, DoD (and the Services) will gain very substantial benefits for their efforts. These advantages include:

- More accurate data faster enabling more uses of data as a resource predictor.
- Shared community-wide interest in meeting users' data requirements;
- Improved opportunity for analyses and more confident decision making;
- Readily understood and accessible data;
- Significantly reduced number of out-of-cycle data calls and data requests made to the Services and real property accountable personnel, thereby freeing resources to maintain accurate records;
- Increased benefits gained from investment while reducing long-term costs;
- Reduced number of systems and interfaces to develop and maintain;
- Responsibility shifted to a single source, ODUSD(I&E), for providing access to real property data;
- Predictable costs for future changes that can be budgeted and resourced by the requiring organization, once the transition to the revised data structure is completed; and
- Minimized cost for sharing information and/or adapting applications.

APPENDICES

A. Current Environment

B. Selected Laws and Regulations

C: List of Applicable Audits and Reports

D. System Descriptions

E. Comparison of DoDI 4165.14 Data with Existing Systems' Data

F. Draft DoD Real Property Inventory Data Model

G. Acronyms

APPENDIX A: Current Environment

With each passing year, more functional communities and Defense Components find it necessary to access real property data. Until the 1990s, this data primarily supported the base engineering community -- charged with property accountability and facilities maintenance, and major commands responsible for stationing units and organizations and providing adequate facilities. Starting in the late 1980s, the need to use real property inventory data significantly increased with the emergence of new missions for environmental compliance, clean up, pollution prevention and conservation and preservation, and with the initiation of a series of four rounds of Base Realignment and Closure (BRAC). In the 1990s, the Chief Financial Officers (CFO) Act of 1990 and the financial accounting requirements established for Defense revolving funds required DoD to formally capitalize and depreciate real property assets. Several years later, Defense leaders began demanding budget requirements for facilities programs be developed based on a unit cost approach that ties to the actual inventory, rather than on previous budget or expenditure levels. This trend is continuing into the present decade with the current Defense-wide effort to document all training ranges and their uses with geo-spatial data. In addition, Congress has also been requesting increasingly detailed information about Defense real property.

The demands placed on real property information are increasing; federal government and Defense audit activities have similarly increased their scrutiny of real property records. Most of the audits and reviews find significant shortcomings with the information.

This increased attention has coincided with a significant reduction in Defense resources and staffs, especially at the installation level. During the past decade of declining budgets, the services' priorities have centered on modernizing weapon systems while real property programs were, and remain, a relatively low priority in DoD. Consequently, at the local level, budget cuts have led to a significant reduction in real property management staff with some local managers de-emphasizing the maintenance of accurate, up-to-date real property records.

Legal and Regulatory Basis

U.S. law and DoD regulations and instructions establish real property accountability and financial reporting requirements. Appendix B provides the text from specific sections of U.S. law and excerpts from regulations cited below.

Real Property Accountability

10 United States Code (USC) 2721 directs the Secretary of Defense to maintain records of the fixed property and installations on both a quantitative and a monetary basis. 10 USC 2682 places all real property facilities that are under the jurisdiction of DoD and used by a DoD activity or agency (other than the Military Departments) under the jurisdiction of one of the Military Departments. 10 USC 2674 places the Pentagon

Reservation under the control of the Secretary of Defense. Washington Headquarters Services (WHS) operates the Pentagon Reservation and maintains leases in the National Capital Region (NCR). Defense real property accountability records (excluding civil works) are maintained by each of the three Military Departments (Army, Navy and Air Force) and WHS.

DoD has implemented the regulatory inventory requirements via DoD Instruction 4165.14, *Inventory of Military Real Property*, dated August 25, 1977. ODUSD(I&E) is in the process of drafting and staffing a revised DoDI to replace the 1977 version. The new draft will identify and standardize data elements deemed essential at the OSD level for real property accountability and for meeting DoD's immediate financial, programming and budgeting requirements. In this report, several of the short-term recommendations are based on implementing the requirements of the new DoDI 4165.14.

Volume 4, Chapter 6, DoD 7000.14-R, *Financial Management Regulation* (FMR) establishes requirements for physical inventories for Property, Plant and Equipment (PP&E). It requires DoD Components to inventory General real property at least every 5 years. However, real property Heritage Assets and real property National Defense PP&E must be inventoried at least every 3 years. Physical inventories shall be taken to ensure the real property is:

- At the location identified in the property accountability records or system;
- As described in the property records; and
- In the condition described in the property records.

Financial Reporting and Statement Requirements

In addition to real property accountability, DoD is also required to capitalize and depreciate its real property holdings. 31 USC 3515 requires each executive agency designated by the President to prepare and submit financial statements to the Director of the Office of Management and Budget (OMB) by 31 March following each fiscal year. 31 USC 3521 further requires DoD Inspector General to perform an audit of DoD's financial statement prior to submission to the Comptroller General.

Volume 4, Chapter 6, DoD FMR provides DoD's accounting standards and policy to meet its financial statement reporting requirements for PP&E. General PP&E consist of tangible assets with an estimated useful life of two years or more; are not intended for sale in the ordinary course of operations; are acquired or constructed with the intention of being used or made available for use by the entity; and have an initial acquisition cost, book value or, when applicable, an estimated fair market value that equals or exceeds the current DoD capitalization threshold of $100,000. General PP&E also includes:

- Assets acquired through capital leases, including leasehold improvements;
- Property owned by the reporting entity even though it may be in the possession of others (e.g., state and local governments, colleges and universities, or contractors);

- Land, other than Stewardship Land with an identifiable cost that was specifically acquired for, or in connection with, the construction of General PP&E; and
- Land rights (which are interests and privileges held by an entity in land owned by others) such as leaseholds, easements, water and power rights, diversion rights, submersion rights, rights-of-way and other like interests in land.

The last bullet above designates land rights as financially accountable real property. Current real property databases include, on a consistent basis, only "owned" real property in their databases. Some "leased" real property is being included, but not on a consistent basis. The new DoDI will direct the inclusion of all land rights.

Volume 4, Chapter 6, DoD FMR also provides rules for financial accounting responsibility for real property. As noted above, Defense real properties "owned" by DoD are accounted for by the three Military Departments and WHS. However, "ownership" alone does not determine financial accountability. The FMR states, "DoD Components shall only report predominately used General PP&E assets owned by other DoD Components when the cost of those assets, taken as a whole, are material to the predominant user Component's financial statements." OUSD(C) plans to rescind the "predominant use" policy in the next version of the FMR. The following examples illustrate how the current policy is implemented:

- For Military Departments - General Fund, if the Air Force is a tenant on an Army installation and the Air Force is the predominant user of a building on that installation, the Army should report the building on the Army's financial statements--not the Air Force. This policy recognizes that the Military Departments routinely use each other's facilities in the normal course of carrying out their missions and the net effect of this "cross use" of facilities is not material to the Military Departments' financial statements.

- For Defense Agencies - General Fund, Defense Agencies that produce financial statements and/or are included in DoD Consolidated Financial Statements generally must recognize and report the facilities used in their operations. Most facilities used by the Defense Agencies are owned by, or titled to, the Military Departments, but these facilities are material to the performance of the Defense Agencies' missions. As such, these facilities are material to the Defense Agencies' financial statements and shall be reported on the annual financial statements of the Defense Agencies and excluded from the financial statements of the Military Departments.

- For Working Capital Funds (WCF), when a WCF activity is the preponderant user of a facility, that WCF activity shall report and depreciate that facility on its annual financial statements. This requirement exists without regard to whether the WCF activity belongs to a Military Department or a Defense Agency. When a WCF activity is not the preponderant user but funds capital improvements, the

WCF activity shall report and depreciate such improvements on their annual financial statements.

- For Medical Facilities and Equipment, the preponderant use policy outlined above shall not apply. These facilities serve the personnel and families working at, or living near, military installations. Therefore, the military installation is the preponderant user of the medical facility, and all medical General PP&E equipment and facilities shall be reported on the annual general fund financial statements of the Military Department that owns the installation upon which a medical facility resides.

Defense Agencies always had a need to track and account for the facilities they use to monitor their Interservice Support Agreements (ISSAs), manage their space, and track the real property projects they fund. DoD's financial accounting responsibilities have intensified the need for all Defense Agencies to track and account for their use of facilities to prepare their financial statements. In effect, each Defense Agency and office now has a vested interest in the accuracy of the Military Department's real property records and has become a "customer" for real property information. Unfortunately, Defense Agencies do not have direct access to the Military Departments' real property inventory databases. Nor is there a formal reconciliation process for a Defense Agency to resolve a discrepancy between the Military Department's real property inventory data and the Defense Agency's internal records.

The DoD FMR specifies depreciation expenses shall be calculated and accumulated using the straight-line method based on the recorded cost less salvage value, and divided equally among accounting periods during the asset's useful life. Appendix B includes a table from the FMR with the recovery periods for real property PP&E.

Note that recorded cost is the basis for computing depreciation and may be different from the acquisition cost, book value, or fair market value, since the recorded cost may include additional ancillary costs.

Finally, DoD FMR also requires that deferred maintenance amounts be reported in annual financial statements for General PP&E real property that have a cost that equals or exceeds DoD $100,000 capitalization threshold. To calculate deferred maintenance, the federal-wide accounting standard permits the use of Cost Assessment Surveys or Life Cycle Cost Forecasts.

Audit Findings

Appendix C provides the list of reports reviewed in preparation for this report. These reports are listed by reference number. The audits and reports cover two major areas related to real property: reports on real property inventory and accountability and reports on the inadequacy of Defense real property resourcing, maintenance and management.

Most of the audits and reviews of real property records are driven by 31 USC 3521 which requires DoD Inspector General (IG) to conduct audits of DoD's annual financial statements.

Real Property Inventory and Accountability

DoD real property record accuracy has been repeatedly challenged in audits performed at all levels. The earliest GAO report reviewed from 1993 (reference 1a) found the Army's system for recording real property could not provide complete and accurate information on facilities with many uncorrected, inaccurate property records. This report is representative of reports from the mid-1990s on the Military Departments' real property data records. In 1996, GAO found that the lack of reconciliation between separate (and unlinked) logistics, custodial and accounting records prevented the detection of significant errors in the real property inventory for Navy plant property (reference 1b). Similarly, in 1998, DoD IG noted the disconnect between systems contributed to its finding that unreliable financial reporting of personal and real property continues to be a DoD systemic control weakness (reference 1d).

The flurry of audits associated with annual financial statements has improved the accuracy of the data in the services' real property databases. However, not all significant problems have been resolved. By 1999, DoD IG noted that for the FY 1998 financial statements, for real property items with reported values greater than $100,000, Defense real property databases contained sufficiently accurate inventories with sampling results indicating less than a 5% error rate for unaccounted items at the 90% confidence level (reference 1e). The following year, DoD IG reviewed the accuracy with which the real property databases recorded additions, deletions and modifications in FY 1999 and determined that, based on reported values, the databases understated by 15.1% the increase in value resulting from changes to the inventories (reference 1f).

In a study of property records conducted by the Army in 1999 (reference 1j), the Army noted that a small number of property records (generally related to utilities) generated enormous estimates of sustainment costs because the units of measure were not understood and inventory quantities recorded were off by one or more orders of magnitude. After conducting field visits, the study group made the following observations on inventory accuracy:

- A utility building was recorded but not its major plant equipment;
- Quantities not measured in length or area were inaccurately recorded; and
- Records were not adjusted for demolished property.

A Navy Audit Service report from May 2000 (reference 1m) provided findings from their review of FY 1999 records that summarize the current problems with Defense real property databases. Their findings were:

- New structures were not always added to the [Internet, Navy Facility Assets Data Store (iNFADS)].

- Demolished buildings and structures were not removed from INFADS or were not removed in a timely manner.
- Capital improvements were not always recorded.
- There is no specific requirement for the ROICC [Resident Officer-in-Charge of Construction] to notify real property management personnel when a project is completed.
- Documentation supporting the value of real property was not maintained.
- Physical inventories are not being performed every five years as required by DoD 7000.14-R.

An Air Force Audit Agency report from August 2000 (reference 1p) provided findings from their review of FY 1999 records and financial statements. Their findings included:

- In collecting and summarizing real property information for financial statement reporting, the Air Force overstated the acquisition value of real property buildings and other structures by $3.4 billion.
- ACES-RP has several shortcomings that must be corrected.
- Real property personnel at more than 50% of the locations audited stated they did not receive adequate training or sufficient written guidance related to ACES.
- Real property personnel did not retain real property documentation in accordance with Air Force Manual (AFM) 37-139, Record Disposition Schedule, 1 March 1996.
- Air Force and Defense Finance and Accounting Service – Denver (DFAS-DE) personnel did not obtain adequate supporting documentation for $1.8 billion of the $2.8 billion in construction-in-progress reported in the financial statements.
- Real property personnel did not always capitalize facilities at the time they placed the facilities in service. As a result $782 million was not recorded in the real property records and may not be recorded in the financial statements.
- Physical inventories are not being performed every five years as required by DoD 7000.14-R.

In another audit report in August 2000 (reference 1q), the Air Force Audit Agency reviewed WCF real property ownership coding and the reporting of addition and deletion actions in the inventory. They determined that both coding and reporting for WCF real property required improvement. 56 of 62 modified facilities and 8 new facilities had inaccurately recorded cost information.

Real Property Management

In a 1999 report (reference 2c), GAO stated that DoD does not have a comprehensive strategy for maintaining its infrastructure with each service setting its own standards and

priorities for maintenance and establishing its own criteria for rating facility conditions. GAO further observed that, because of these variances, data drawn from across the services (including from rating systems) is generally incomplete and inconsistent and the Congress cannot be assured that its appropriations for maintenance and repairs provide the best return on investment. One of the GAO recommendations was to create online inventory and cost databases to track real property maintenance (RPM) spending and activity across and within the services and with direct access by OSD to permit meaningful comparisons across DoD.

Assessment on Findings

While real property databases are improving, the improvements are not consistent and are not sufficient to inspire confidence in results and reports generated using real property data. The audits driven by financial statement requirements have raised the visibility of real property database shortcomings but have been insufficient to generate the motivation to correct major deficiencies such as timely updates of records still existing in these databases. There is no operational impact at the local level from producing more accurate financial statements at the agency level. Local personnel responsible for maintenance of data (and their supervisors) perceive few if any business consequences resulting from failure to maintain accurate real property records. Compelling business needs drive sustainable improvements. When accountable personnel and local managers recognize those compelling needs and see real value resulting from maintaining accurate, up-to-date real property records, they will place a higher priority on maintaining these records.

The driver of change in real property accountability is shifting from responses to financial statement requirements to needs that are more business driven: functional area requirements. The GAO report on real property management (reference 2c) points toward compelling business requirements -- justification of resource requirements to Congress to secure funding for real property support. **This report will stress using business requirements instead of regulatory compliance to drive change and improvement in real property accountability.**

Real Property Inventory Databases

The three Military Departments and Washington Headquarters Services (WHS) maintain the real property accountable records and databases for Defense. Appendix D contains brief descriptions of each system mentioned below.

Army (Less Army National Guard)

The Army has about 250 real property specialists maintaining accountability for active Army installations, National Guard U.S. Property and Fiscal Offices (USPFOs) and U.S. Army Reserve Command Reserve Support Centers. A few Army installations are permitted to DLA who maintains the real property inventory for those installations. The Army maintains its real property inventory records at the local level in the real property module of the Integrated Facilities System – Client/Server (IFS-C/S) except for the Army

National Guard (ARNG). The ARNG uses PRIDE (Planning Resource for Infrastructure Development and Evaluation), a commercial software product from Peregrine Systems being adapted for ARNG use by Anteon Corporation.

IFS-C/S (hereafter referred to as IFS) is the latest version of an Army-approved system that has been supporting their base engineering community since 1976. The IFS customer base consists of more than 100 Army installations worldwide, DLA installations and 16 Army Reserve reporting sites. IFS is composed of modules that support the base engineering business functions of Real Property, Work Management, Job Cost Accounting, Work Estimating, Supply and Contract Administration. In addition, the system provides automated interfaces with Army financial, logistics and engineering systems. While IFS is basically an installation business system, it provides upward reporting of common business and performance information to higher command levels.

The Army collects its real property information semi-annually via electronic posting of an Oracle database from each installation to a central server (U.S. Army Materiel Command [AMC] and the ARNG consolidate their information before forwarding). These files contain two tables: one table with the raw real property data plus summarized capitalization data and another table with the raw data for capitalization. This data is loaded into a database and subjected to an independent quality control review process. The system generates reports listing apparent discrepancies. These reports are forwarded through the lower headquarters to the installations for review and correction. The physical property data is only corrected at the local level. Installations with corrections resubmit their corrected data tables. The corrected database is copied to the Headquarters, Executive Information System (HQEIS). HQEIS serves as the Army's data warehouse for Army real property at the macro level of detail and provides real property information for Army decision support systems. Annually, the Army submits HQEIS data (including the ARNG's state-owned, federally-funded property) in an Oracle database to OSD for inclusion in their Facility Assessment Database (FAD).

Army National Guard

The ARNG uses PRIDE to maintain its inventory of real property, including leased, state- and federally-owned properties. While PRIDE possesses an array of functional capabilities, the ARNG has only implemented Property Portfolio, Lease Management and Project Management.

Because the PRIDE applications are modular in nature, the ARNG is able to add new capabilities as time and money comes available. The ARNG has PRIDE deployed in a client-server system with the central server at ARNG Headquarters linked to the states and field sites via an intranet, GuardNET. Each state's Facility Management Officer (FMO) has password-protected access to PRIDE and makes all real property inventory entries.

For the Army's semi-annual data call, ARNG real property data is consolidated at the National Guard Bureau (NGB), put into ORACLE tables, and forwarded for input into HQEIS.

Navy (including Marine Corps)

The Department of the Navy maintains its real property inventory records in the newly established web based Internet Navy Facility Assets Data Store (iNFADS), which is maintained by the Naval Information Technical Center (NITC).

The Navy "ownership" of the majority of real property lies with their Installation Management Claimants. In turn, these Installation Management Claimants have given, in the majority of the cases, the management of real property at the various geographical locations to the Navy's Regional Commanders. There are a few stand-alone Navy activities that report to the Regional Coordinator versus the Regional Commander. Marine Corps installation commanders designate their real property accounting officers. Most Marine Corps installations have stewardship and plant account authority.

Generally, the Regional Commander/Stand-Alone activities enter changes directly into the iNFADS. If a Regional Commander or Stand-Alone activity does not have access to iNFADS, they can transmit the information to their Engineering Field Division (EFD) for entry into iNFADS. Some Marine Corps activities send data updates to Marine Corps Headquarters for entry into iNFADS.

Each October, NITC creates a Real Property Maintenance Activities (RPMA) extract from the iNFADS using the real property records as of 30 September. This extract is passed to Navy Headquarters and is used by the staff to respond to certain queries from all sources during the current fiscal year (FY). The headquarters places this extract (a single large file) on the Naval Shore Installation home page in ASCII format for OSD to retrieve.

Air Force

Each of the 198 Air Force installations maintains its own real property inventory data locally in the Real Property module of the Automated Civil Engineer System (ACES-RP). Additional information is still contained in "header files" in the Interim Work Information Management System (IWIMS). IWIMS is an old mainframe system developed to support Air Force base engineers organizations and to meet the Air Force's original need to report an inventory to General Services Administration (GSA) and DoD. The CFO Act requirements forced a move from IWIMS to ACES to enable the Air Force to collect and report the data needed for annual Financial Statements. Several engineering functions still use IWIMS. ACES is being developed to meet civil engineering needs under CFO Act. In three to five years, ACES will become the single Air Force civil engineering information system. By the end of this FY, all Air Force installations, including Government-Owned, Contractor- Operated facilities, will have real property data automated in ACES-RP for financial reporting.

Air Force real property inventory data is centrally maintained at Gunter Annex, Maxwell AFB, AL. Contractors at Gunter can log on to individual systems at bases in "real time." The Air Force and contractors collect end-of-year reports from ACES-RP systems at each installation and coordinate the validation of the data by the Air Force's Major Commands (MAJCOMs) and the transmission of the data to DFAS in Denver. The Air Force provides its end-of-year inventory to OSD in the form of a "read-only" ACCESS database on a CD-ROM.

Washington Headquarters Services

In 1990, the Secretary of Defense was given statutory authority for the Pentagon Reservation. WHS executes this authority for the Secretary of Defense. This includes the Pentagon, the Navy Annex, the Remote Delivery Facility and several other facilities. WHS provides space management services to 17 DoD Components for commercial facilities leased in the National Capital Region (NCR). They also prepare an annual report for GSA on all administrative space owned and leased by DoD in the NCR. They have launched a strategic space management initiative with the 17 DoD Components to develop a plan to analyze, project and manage both lease and owned space in the NCR with a major goal of reducing and consolidating leased commercial space to enhance DoD's ability to provide better security for DoD workers.

WHS provides their real property inventory to GSA but not to OSD. WHS has been informed of the requirement to report their real property data to OSD and has begun the effort to comply with this requirement. WHS maintains their inventory data in an obsolete system and is in the process of purchasing a commercial software product currently on GSA's software schedule and compatible with GSA's worldwide property inventory reporting requirements. Their intent is to adapt this package to also meet DoD real property reporting requirements.

Office of the Secretary of Defense

ODUSD(I&E) is the functional proponent within OSD for installation management including real property management. This office works closely with OD(PA&E) to develop improved methods for determining and evaluating real property resource requirements to support program analyses. ODUSD(I&E) also works closely with USD(C) in evaluating and preparing material for budget analyses and exhibits and supporting requirements for the annual financial statements required in 31 USC 3515. To support their analytic requirements, OD(PA&E) has created a data warehouse called the Facility Assessment Database (FAD). Its intended purpose is to support facilities-related cost analysis by making available at the installation level of detail real property data, personnel data, weapons system data and execution data on facilities sustainment, restoration and modernization.

FAD is a contractor-maintained database hosted on an OSD-owned SQL server that maintains the Military Departments' RP data in separate tables and integrates selected fields into a single table for use by analysts. The FAD consists of about 11,000,000 real

property records from 1989 thru 2000. For FY 2000, there are about 800,000 records. This database is available locally to a handful of OD(PA&E) analysts and the support contract personnel. It has a GUI application for OD(PA&E) analysts to interface with the database thru canned queries and reports. ODUSD(I&E) contacts the support contractor to perform data runs/queries. Due to the inconsistency among services' inventory data, errors in the databases, different units of measure and different definitions, only a couple of support contractor personnel with several years of experience using this real property data and a few OD(PA&E) analysts, can query the Access tables and retrieve a result with any level of confidence in its validity or accuracy.

Each service consolidates all of the data for the property they "own," including property for the National Guard, Reserves and Defense Agencies. Near the end of each fiscal year, ODUSD(I&E) notifies the Military Departments via a memo to submit their real property inventory data as of 30 September to OSD for inclusion in the FAD.

- The Army places their "Facility" and "Installation" data tables in an Oracle database file on an FTP site for the FAD support contractor to download. The database includes their whole database plus any look-up tables that have changed since the last submission.
- The Air Force submits data from an Oracle database, converted to an MS ACCESS format, on a CD ROM to the FAD support contractor.
- The Navy places an ASCII file on an Internet site for the FAD support contractor to download.

The support contractor runs pre-established queries to validate the records and to identify "anomalies" in the data submitted. These anomalies are forwarded in a spreadsheet to the services for review and validation or correction. The support contractor receives changes from the services, updates the Access tables for each service's input from the edited spreadsheets, transforms the services' data, and, by February, populates the FAD with the inventory data.

General Services Administration (GSA)

The three Military Departments and WHS report their real property data to the GSA on an annual basis. GSA maintains databases for all federally-owned and federally-leased facilities and properties. From this data, GSA produces two annual reports: *Summary Report of Real Property Leased by the United States Throughout the World as of September 30, [xxxx]* and *Summary Report of Real Property Owned by the United States Throughout the World*.

Financial Reporting

As noted earlier, DoD FMR specifies real property depreciation expenses shall be calculated and accumulated using the straight-line method based on the recorded cost less salvage value. The financial balance sheets for the Services and the Services' working

capital funds (WCFs) report Acquisition Cost, Accumulated Depreciation and Net Book Value. The Services' WCF facilities (where the WCF has exclusive or preponderant use) are segregated (and mutually exclusive) from the Services' facilities. Defense WCFs treat buildings as leased facilities from the Services. However, all WCFs must treat capital improvements (>$100K) to their facilities as depreciable assets irrespective of the funding source for the capital improvement.

Financial statements also require lease costs. Heritage assets and stewardship lands require supplementary information provided with the financial statements. The DoD FMR also requires that deferred maintenance amounts be reported in annual financial statements for General PP&E real property that have a cost that equals or exceeds DoD's $100,000 capitalization threshold. For each facility, the following data is required to produce the financial statements:

- Acquisition date and cost;
- Whether real property is a "Building" versus "Structure;"
- Improvements (including leasehold improvements)>$100K and dates of improvements;
- Owner of the facility;
- Cost of leases for current year and next four additional years;
- Tenants of the facility with financial accounting responsibility; and
- Heritage code.

DoD's *Financial Management Improvement Plan* (FMIP) is moving DoD to an integrated financial management system comprised of critical finance and accounting systems, as well as the critical feeders systems that perform DoD's operations functions by capturing the acquisition, allocation, transportation, transfer, management, use, or disposal of resources. As a critical feeder system, real property systems must allow for routine actions (such as transfer of property) to be reported to general ledger accounts. The FMIP also calls for the creation of standard data elements and identifies an interface strategy where data is separated from applications and the flow of data among system interfaces occurs through a corporate database.

DoD's real property systems and databases were not designed to support financial reporting requirements. Under DoD's implementation strategy, unless DoD Component has a fully operational property accountability system that meets applicable requirements (to include the capability to capture and maintain historical cost data and calculate depreciation), it must expedite the implementation of a CFO compliant property system for its General PP&E assets prior to the end of FY 2003. The only current compliant system for both personal and real property is the Defense Property Accountability System (DPAS). However, DPAS is not used by the Military Departments to meet their real property accounting requirements because it does not meet all of the Services' real property inventory requirements.

Defense Logistics Agency

DLA operates five installations belonging to the Army. Consequently, DLA uses IFS-C/S to account for and support these facilities. However, IFS does not meet federal standards for CFO reporting and does not support depreciation of assets. Therefore, DLA uses DPAS to generate depreciation for all of its real and personal property both where DLA is the host and where DLA is a tenant. DLA has a critical business requirement (beyond generating financial statements) driving its need to capture capital expenditures and to depreciate its assets – its WCF activities' rates are driven, in part, by depreciation.

DLA had significant problems fielding DPAS because they had created real property records in DPAS with the appropriate fields for depreciation prior to linking DPAS with their IFS Real Property module, and DPAS is linked on a real-time basis with DBMS, DLA's financial system. Therefore, they could not directly populate DPAS with the IFS data while maintaining the active links with DLA's financial management systems. DLA is working with the Army to deploy an interface between DPAS and IFS at its five installations. At each installation, this interface will populate DPAS with the real property inventory information required to generate depreciation. Capital transactions recorded in DPAS will be passed to both the financial management system and IFS. DPAS will transfer to IFS the cumulative cost of depreciation for each facility and improvement. The result will be the synchronization of the real property inventory with both the financial asset reporting system (DPAS) and the Agency financial system.

Army

The Army redesigned the IFS real property module's database to accommodate recording the capitalization data required for financial reporting. As noted above, it does not meet federal standards for CFO reporting. Currently, the Assistant Chief of Staff for Installation Management (ACSIM) provides the financial information required for financial reports to DFAS. The Army queries HQEIS to create five reports for:

- Army General Fund;
- Army WCF;
- Defense Agency General Fund by Defense Agency;
- Heritage Assets; and
- Stewardship Lands.

The Army began implementing DPAS in November 1999 to generate its depreciation data and transmit that data to the financial accounting systems. However, they are not satisfied with the results and the cumbersome workload it has created for their installations and are comparing the costs and feasibility of changing IFS to interface with DFAS accounting systems rather than using DPAS.

Navy

The Navy has chosen the iNFADS as its sole management information system for Real Property. Department of the Navy real property records will be reported directly to the financial systems by iNFADS. DoD's FMIP reports that the audit community has found iNFADS to be accurate for existence and completeness and for historical costs. The Navy is developing internal controls, depreciation modules and links with the Standard Accounting and Reporting System. iNFADS does not meet federal standards for CFO reporting.

Air Force

In response to the requirements from the CFO Act of 1990, the Air Force is migrating from IWIMS to ACES. ACES is a large civil engineer system with Real Property as its first module. In three to five years, ACES will become the single Air Force system. The Air Force does not use DPAS. Each installation completes its end-of-year real property reports in Oracle using ACES-RP and forwards the reports to the central database warehouse at Gunter Annex. The financial reporting systems supporting Air Force MAJCOMs have not been automated and cannot accept Oracle reports. A contractor at Gunter Annex translates the end-of-year Oracle files into COBOL for transmission to the appropriate MAJCOMs where they are reviewed and validated. Contractors at Gunter Annex re-translate the files back to Oracle and transmit them individually as flat files to DFAS in Denver for use in the Air Force Financial Statement.

ACES-RP will be installed at the MAJCOMs this year – but it probably will be just repository files that are refreshed weekly or monthly. ACES-RP is currently undergoing a validation audit by the Air Force Audit Agency for CFO compliancy.

Washington Headquarters Services

WHS reports its real property information for the Pentagon Maintenance Revolving Fund to DFAS through quarterly trial balance reports. The trial balance contains information on construction in progress, buildings, ADP software and land. Trial balances contain source documentation used to prepare financial statements.

Requirements Determination for Programming and Budgeting

Up to this point, the discussion has centered primarily on legally driven regulatory requirements: accountability and financial reporting. The emphasis now shifts to uses for real property data driven by DoD's operational needs. One of the primary functions of the Service headquarters and OSD is to develop and justify Defense programs and budgets to obtain the resources required to equip and sustain our military forces. While adequate facilities are absolutely essential to Defense, facility restoration, modernization and sustainment are often relatively low program and budget priorities compared with modernizing and sustaining weapon systems and training and deploying military forces. Because of this relatively low priority, real property program and budget analysts must be capable of clearly and convincingly conveying the impact of policies and resource

decisions on the ability of Defense facilities to adequately support Defense requirements. Defense decision makers should make their resource allocation decisions with a firm understanding of the impacts, both short- and long-term, on the whole Defense "system."

DoD entered the 1990s with a real property infrastructure exceeding the requirements of their military forces. After four rounds of BRAC and Defense budget and force structure cuts, facility sustainment and modernization's share of Defense resources has declined more than have requirements and overall Defense budget levels.

Office of the Secretary of Defense

During the first Quadrennial Defense Review (QDR) in 1997, analysts from the Military Services, Agencies and OSD, created a consolidated real property database to assess the force structure's relationship to the real property infrastructure and the related costs for future programming and budgeting. This effort highlighted the inadequacy of current information and methodologies to meet DoD's analytic requirements. Subsequently, OSD has worked together with the Service and Defense agency staffs to create a more robust analytic capability. This study is a part of that effort.

To date, OSD has not established and enforced effective data standards. However, ODUSD(I&E) has been doing some preliminary work to prepare for data standardization. During the QDR, ODUSD(I&E) noted that the existing unique facility classification systems used by the services could not support accurate analyses at OSD. In 1998, ODUSD(I&E) worked with the services to create a new classification scheme called **Facility Analysis Categories** (FACs). The service-unique category codes have been mapped to the FACs and the units of measure used have been standardized across the services. FACs have standardized facility types to designate the same thing across services. With this standardization, analysts can:

- Answer questions of how many of a facility type exist in DoD;
- Share information and compare;
- Develop and evaluate stationing, sustainment, capacity and recapitalization requirements; and
- Develop relationship to readiness for each category.

Following the development of the FACs, ODUSD(I&E) published a *DoD Facilities Cost Factors Handbook*. For each FAC, ODUSD(I&E) identified two cost factors: one for sustainment and one for construction. Over 90% of the cost factors are based on commercial benchmarks with the sources for each identified in the *Handbook*. The cost factors have been developed for use at the programmatic level by any DoD organization.

These two initiatives, standardized facility types and commercially benchmarked cost factors, led to the creation of DoD **Facility Sustainment Model** (FSM). FSM projects the costs to sustain all of DoD's facilities over the Future Year Defense Program (FYDP) years. The FAD database is used as the feeder system for FSM. However, before this can

be done, FAD data must be normalized using additional data obtained from the Services, DLA and the Office of the Assistant Secretary of Defense (Health Affairs) (OASD[HA]). The data is transformed to correct anomalies within the data, and to assign funding source and funding organization responsibility to the facilities. The normalized FAD inventory data is consolidated by FAC for each installation. FSM then projects the inventory data from three through eight years into the future, factoring in installation closures, facility disposals, excess facilities, facility transfers and new construction. This data is not recorded in FAD and must be provided separately by the services. FSM combines this normalized inventory data with *Handbook* sustainment cost factors to create estimated sustainment costs for the FYDP years.

In the future, FSM will be used by all of the services to project their sustainment requirements. Currently, the Army allocates its sustainment resources using data from its real property inventory data. Unless a facility is recorded in the real property inventory, the Army will not provide resources for the facility. The Army's approach is similar to FSM.

Plant replacement value (PRV) is an important metric for facility analyses. It is a means of describing and analyzing an inventory of facilities made up of multiple units of measure (i.e., square feet, square yards, feet of birthing, beds, etc.). PRV's use is currently limited because it uses real property inventories of questionable accuracy and the Services use different methods for developing their cost factors for PRV. However, when PRV is standardized and DoD inventories are accurate, PRV can play an important analytic role. ODUSD(I&E) will use PRV in developing other models for estimating recapitalization costs and for evaluating the impact of resource decisions and funding levels on Defense real property. They could also be used to predict construction and sustainment costs for alternative basing scenarios. The standard DoD algorithm for calculating PRV is:

> PRV = (Facility Quantity x Facility Type Construction Cost Factor x Area Cost Factor) x 1.2.
>
> (The 1.2 multiplier accounts for the supervision, inspection, overhead and design costs associated with construction)

The **recapitalization metric** is being designed to articulate DoD facilities restoration and modernization needs. The recapitalization rate is the rate, expressed in years, in which the planned (not current) facility plant is restored and modernized, given current investment spending:

> Recapitalization Rate = PRV / Recapitalization Funding.

ODUSD(I&E) and OD(PA&E) are working to create a **facility aging model** (FAM) to answer the following questions:

- What is the average age of the current set of facilities?
- How long are they expected to last?

- How will planned inventory actions and investments affect the normal aging process?
- Is the remaining useful life increasing or decreasing?
- What investment is required to "hold the line" on aging, or lower it by a specified percentage?
- What is the age profile of a selected facility type or investment category?
- What is the fraction of facilities entering a "geriatric zone"?

The FAM will add a facilities portfolio to other Defense aging models such as those for air frames. FAM will be done at the installation level but will group facilities of the same age and the same Investment Category: RDT&E, Operations, Maintenance and Support. Based on PRV, FAM will produce a prediction of how much to spend on facility reinvestment. It will project the age and the remaining life of DoD facility inventory depending on the amount of reinvestment. A major problem with using FAM is that the current facility inventory records the chronological age and not the effective age of facilities.

The Military Services and Defense Agencies prepare Program Objective Memorandum (POM) exhibits each year. These exhibits aid DoD in its annual review (called the Program Review) of DoD's spending plans. Specifically, POM exhibits, E-1 through E-5, are used to support DoD's facility programs. DoD is attempting to streamline reporting for the Program Review and would like to reduce the burden on the Services/Agencies to prepare these exhibits; however, not all real property inventory data required to populate applicable exhibits are currently reported in DoD inventory systems. The Army uses the Best Available Lease Database to identify the number of leased buildings and captures the number of barracks spaces via a data call. Further, Army utility data is obtained from ACSIM's Facilities Policy Division. The Navy uses DoD reports 1410 and 1411 to capture family housing summary data, and the Marine Corps populates POM exhibits through a complete data call. The Air Force relies on a data call and their Dormitory Master Plan to capture POM barracks spaces. The source of Air Force family housing data is a is a system other than ACES. If POM reporting requirements remain unchanged, the data elements maintained in the Services' inventory systems and the proposed DoD consolidated inventory would have to expand to for OSD to produce these exhibits.

Functional Requirements Using Real Property Inventory Data

Numerous functional areas and organizations in DoD require real property inventory information from all three Military Departments. In addition to the requirements already discussed, they require real property inventory data to:

- Facilitate the use, management and maintenance of real property;
- Enable evaluation of real property assets for planning;

- Identify and justify requirements;
- Develop reimbursement rates and support Interservice Support Agreements (ISSAs);
- Monitor compliance with laws, rules and regulations;
- Support installation tenants information requirements;
- Support capacity analyses;
- Support space management and stationing;
- Conduct "what if" assessments at HQ levels; and
- Support reporting requirements.

Each functional area and organization faces a unique set of business requirements for which they develop and use information systems. Real property data is required to support environmental, medical, educational, military operational, BRAC and family housing programs, to name just a few. No single system related to real property currently serves such a diverse set of requirements. However, because of the accuracy problems documented in the audits and the non-standardization of data between Services, the Defense Agencies and functional communities face significant challenges in obtaining and using real property data. The following paragraphs provide a few illustrative examples.

For Family Housing management, the Army maintains a separate inventory from IFS-C/S in a system for housing management that duplicates real property data in IFS-C/S. There is currently no linkage or interface between IFS-C/S and the housing system. Therefore, corrections and updates made in one system will not be reflected in the other.

Both the Navy and Marine Corps maintain a separate off-line inventory for Family Housing management that duplicates real property data in the iNFADS. There is no linkage maintained between these databases. The Marine Corps database is kept separate because they split their inventory by enlisted grades in a different manner than any of the other Services. For example, the Marine Corps groups enlisted grades by E1 through E3, E4 through E5 and E6 through E9. The Navy and the other Services group enlisted grades by E1 through E4, E5 through E6 and E7 through E9. The Marine Corps also uses a different unit of measure (UM) – man spaces. The Navy uses the UM - rooms.

Air Force housing assets are included in their real property inventory database, but are linked to the data maintained by Family Housing offices.

Defense health care activities, DLA, the Defense Commissary Agency (DeCA) and the Department of Defense Education Activity (DoDEA) are tenants in facilities on many installations operated by the Services. They face significant hurdles in obtaining and maintaining current real property inventory data to support their management requirements. For example, DoDEA has about 220 schools located on or near 120

military installations. They found that property records maintained in the real property databases were so inaccurate or incomplete that they hired a contractor in 1994 to survey all of their facilities to obtain accurate inventory data. They currently maintain this data in a spreadsheet. They are planning to create an online facilities management information system accessible to all of their activities world-wide.

These examples demonstrate the clear need for ready electronic access to standardized real property inventory. All functional areas are spending resources on workarounds to compensate for inaccurate, incomplete, inaccessible non-standard real property inventory data.

Technological Changes

Today's technology enables real time access to increasingly large amounts of data. Unfortunately, common understanding is not guaranteed through access alone. Ability to communicate across massive amounts of data transcending functional areas must be engineered into the data itself. Users from all functional areas need to coordinate and agree on common terminology, standard definitions, explicit units of measure and valid data relationships if they expect to successfully interface. Currently, in DoD, independent "systems" using their own independent databases and metadata are inhibiting information integration and adversely affecting DoD's ability to communicate across functional stovepipes. We must recognize up front that standardization is a necessary precondition for DoD to speak about real property with one voice. Throwing technology at poorly engineered data will only serve to deliver confusion at the speed of light. Achieving consensus on terms and definitions is likely to be a major challenge, but, once achieved, DoD can take advantage of today's wealth of technology to evolve to an environment of shared data that is accessible from anywhere.

With the sudden appearance of the Internet, the task of physically moving data around is quickly being replaced with the concept of accessing data where it is stored. Data does not need to be physically moved to be virtually shared. Standardization facilitates the virtual integration of data so that the decision to move the data is reduced to one of cost and performance rather than one of necessity. "Common Operating Environments" (COEs) and shared data have been elusive goals of DoD for many years, but only recently have functional managers begun to embrace the concept. As described above, functional managers have always recognized the natural information integration points with other functionals but have found it too difficult or impossible to get usable information from sources outside their stovepipe. Managers often try to deflect the question to another community or manually collect enough second or third hand information to provide a best guess. Or, as discussed in an example above, they contract to have their own databases created. Managers now realize that Web technology will support direct access to source information and eliminate the need for middlemen. COEs and similar technical architectures will greatly reduce the cost of sharing data across multiple communities, but data standardization is the primary key to understanding and communicating.

To maximize the utility of shared databases, users should consider the data as a corporate resource built to corporate standards. Users should understand that applications designed to access the corporate database (for data entry or retrieval) can be customized to meet functional requirements. Unique perspectives and business rules can be engineered into the application to support a functional requirement without any direct impact on the corporate database. Properly designed applications are no more than input/output devices controlled by embedded business rules. They assign data maintenance responsibilities down to the table or data element level and allow many functional communities to access a single integrated database.

APPENDIX B: Selected Laws and Regulations

Sections of the U.S. Code cited in the body of the report are provided below for reference. The specific items of interest to real property accounting are highlighted.

10 USC 2721. Property records: maintenance on quantitative and monetary basis

(a) Under regulations prescribed by him, the Secretary of Defense shall have the records of the fixed property, installations, major equipment items and stored supplies of the Military Departments maintained on both a quantitative and a monetary basis, so far as practicable.

(b) The regulations prescribed pursuant to subsection (a) shall include a requirement that the records maintained under such subsection -

(1) to the extent practicable, provide up-to-date information on all items in the inventory of the Department of Defense;

(2) indicate whether the inventory of each item is sufficient or excessive in relation to the needs of the Department for that item; and
(3) permit the Secretary of Defense to include in the budget submitted to Congress under section 1105 of title 31 for each fiscal year, information relating to -

(A) the amounts proposed for each appropriation account in such budget for inventory purchases of the Department of Defense; and
(B) the amounts obligated for such inventory purchases out of the corresponding appropriations account for the preceding fiscal year.

10 USC 2682. Facilities for defense agencies

The maintenance and repair of a real property facility for an activity or agency of the Department of Defense (other than a military department) financed from appropriations for military functions of the Department of Defense will be accomplished by or through a military department designated by the Secretary of Defense. A real property facility under the jurisdiction of the Department of Defense, which is used by an activity or agency of the Department of Defense (other than a military department) shall be under the jurisdiction of a military department designated by the Secretary of Defense.

10 USC 2674. Operation and control of the Pentagon Reservation

(a)

(1) Jurisdiction, custody and control over, and responsibility for, the operation, maintenance and management of the Pentagon Reservation is transferred to the Secretary of Defense.

(2) Before March 1 of each year, the Secretary of Defense shall transmit to the Committees on Armed Services of the Senate and the House of Representatives, the Committee on Environment and Public Works of the Senate and the Committee on Public Works and Transportation of the House of Representatives a report on the state of the renovation of the Pentagon Reservation and a plan for the renovation work to be conducted in the fiscal year beginning in the year in which the report is transmitted.

(b) The Secretary may appoint military or civilian personnel or contract personnel to perform law enforcement and security functions for property occupied by, or under the jurisdiction, custody and control of the Department of Defense, and located at the Pentagon Reservation. Such individuals -

(1) may be armed with appropriate firearms required for personal safety and for the proper execution of their duties, whether on Department of Defense property or in travel status; and

(2) shall have the same powers (other than the service of civil process) as sheriffs and constables upon the property referred to in the first sentence to enforce the laws enacted for the protection of persons and property, to prevent breaches of the peace and suppress affrays or unlawful assemblies, and to enforce any rules or regulations with respect to such property prescribed by duly authorized officials.

(c)

(1) The Secretary may prescribe such rules and regulations as the Secretary considers appropriate to ensure the safe, efficient and secure operation of the Pentagon Reservation, including rules and regulations necessary to govern the operation and parking of motor vehicles on the Pentagon Reservation.

(2) Any person who violates a rule or regulation prescribed under this subsection is liable to the United States for a civil penalty of not more than $1,000.

(3) Any person who willfully violates any rule or regulation prescribed pursuant to this subsection commits a Class B misdemeanor.

(d) The Secretary of Defense may establish rates and collect charges for space, services, protection, maintenance, construction, repairs, alterations, or facilities provided at the Pentagon Reservation.

(e)

(1) There is established in the Treasury of the United States a revolving fund to be known as the Pentagon Reservation Maintenance Revolving Fund (hereafter in this section referred to as the "Fund"). There shall be deposited into the Fund funds collected by the Secretary for space and services and other items provided an organization or entity using any facility or land on the Pentagon Reservation pursuant to subsection (d).

(2) Monies deposited into the Fund shall be available, without fiscal year limitation, for expenditure for real property management, operation, protection, construction, repair, alteration and related activities for the Pentagon Reservation.

(f) In this section:

(1) The term "Pentagon Reservation" means that area of land (consisting of approximately 280 acres) and improvements thereon, located in Arlington, Virginia, on which the Pentagon Office Building, Federal Building Number 2, the Pentagon heating and sewage treatment plants and other related facilities are located, including various areas designated for the parking of vehicles.

(2) The term "National Capital Region" means the geographic area located within the boundaries of (A) the District of Columbia, (B) Montgomery and Prince Georges Counties in the State of Maryland, (C) Arlington, Fairfax, Loudoun and Prince William Counties and the City of Alexandria in the Commonwealth of Virginia, and (D) all cities and other units of government within the geographic areas of such District, Counties and City.

31 USC 3515. Financial statements of agencies

(a) Not later than March 31 of 1992 and each year thereafter, the head of each executive agency identified in section 901(b) of this title shall prepare and submit to the Director of the Office of Management and Budget a financial statement for the preceding fiscal year, covering -

(1) each revolving fund and trust fund of the agency; and

(2) to the extent practicable, the accounts of each office, bureau and activity of the agency which performed substantial commercial functions during the preceding fiscal year.

(b) Each financial statement of an executive agency under this section shall reflect -

(1) the overall financial position of the revolving funds, trust funds, offices, bureaus and activities covered by the statement, including assets and liabilities thereof;

(2) results of operations of those revolving funds, trust funds, offices, bureaus and activities;

(3) cash flows or changes in financial position of those revolving funds, trust funds, offices, bureaus and activities; and

(4) a reconciliation to budget reports of the executive agency for those revolving funds, trust funds, offices, bureaus and activities.

(c) The Director of the Office of Management and Budget shall prescribe the form and content of the financial statements of executive agencies under this section, consistent with applicable accounting principles, standards and requirements.

(d) For purposes of this section, the term "commercial functions" includes buying and leasing of real estate, providing insurance, making loans and loan guarantees, and other credit programs and any activity involving the provision of a service or thing of value for which a fee, royalty, rent, or other charge is imposed by an agency for services and things of value it provides.

(e) Not later than March 31 of each year, the head of each executive agency designated by the President may prepare and submit to the Director of the Office of Management and Budget a financial statement for the preceding fiscal year, covering accounts of offices, bureaus and activities of the agency in addition to those described in subsection (a).

31 USC 3521. Audits by agencies

(a) Each account of an agency shall be audited administratively before being submitted to the Comptroller General. The head of each agency shall prescribe regulations for conducting the audit and designate a place at which the audit is to be conducted. However, a disbursing official of an executive agency may not administratively audit vouchers for which the official is responsible. With the

consent of the Comptroller General, the head of the agency may waive any part of an audit.

(b) The head of an agency may prescribe a statistical sampling procedure to audit vouchers of the agency when the head of the agency decides economies will result from using the procedure. The Comptroller General -

(1) may prescribe the maximum amount of a voucher that may be audited under this subsection; and

(2) in reviewing the accounting system of the agency, shall evaluate the adequacy and effectiveness of the procedure.

(c) A disbursing or certifying official acting in good faith under subsection (b) of this section is not liable for a payment or certification of a voucher not audited specifically because of the procedure prescribed under subsection (b) if the official and the head of the agency carry out diligently collection action the Comptroller General prescribes.

(d) Subsections (b) and (c) of this section do not -

(1) affect the liability, or authorize the relief, of a payee, beneficiary, or recipient of an illegal, improper, or incorrect payment; or

(2) relieve a disbursing or certifying official, the head of an agency, or the Comptroller General of responsibility in carrying out collection action against a payee, beneficiary, or recipient.

(e) Each financial statement prepared under section 3515 by an agency shall be audited in accordance with applicable generally accepted government auditing standards -

(1) in the case of an agency having an Inspector General appointed under the Inspector General Act of 1978 (5 U.S.C. App.), by the Inspector General or by an independent external auditor, as determined by the Inspector General of the agency; and

(2) in any other case, by an independent external auditor, as determined by the head of the agency.

(f) Not later than June 30 following the fiscal year for which a financial statement is submitted under section 3515 of this title by an agency, the person who audits the statement for purpose of subsection (e) shall submit a report on the audit to the head of the agency. A report under this subsection shall be prepared in accordance with generally accepted government auditing standards.

(g) The Comptroller General of the United States -

(1) may review any audit of a financial statement conducted under this subsection by an Inspector General or an external auditor;

(2) shall report to the Congress, the Director of the Office of Management and Budget and the head of the agency which prepared the statement, regarding the results of the review and make any recommendation the Comptroller General considers appropriate; and

(3) may audit a financial statement prepared under section 3515 of this title at the discretion of the Comptroller General or at the request of a committee of the Congress. An audit the Comptroller General performs under this subsection shall be in lieu of the audit otherwise required by subsection (e) of this section. Prior to performing such audit, the Comptroller General shall consult with the Inspector General of the agency which prepared the statement.

(h) Each financial statement prepared by an executive agency for a fiscal year after fiscal year 1991 shall be audited in accordance with this section and the plan required by section 3512(a)(3)(B)(viii) of this title.

Excerpts from DoD Financial Management Regulation, Volume 4, Chapter 6

060102. Overview

Four categories of PP&E have been defined for accounting and reporting purposes. Specific accounting guidance is contained in this Chapter for each category of PP&E. The categories are:

1. General PP&E,
2. National Defense PP&E,
3. Heritage Assets, and
4. Stewardship Land.

060103. Definitions

The four categories of PP&E are defined below. Within each definition, a section reference is provided where specific policy guidance is located within this Chapter.

A. General PP&E.

1. General PP&E consists of tangible assets that meet all of the following criteria:

a. Have an estimated useful life of two years or more;

b. Are not intended for sale in the ordinary course of operations;

c. Are acquired or constructed with the intention of being used or being available for use by the entity; and

d. Have an initial acquisition cost, book value or, when applicable, an estimated fair market value (see paragraph 060202 for definitions of these terms) that equals, or exceeds, DoD capitalization threshold. The current DoD capitalization threshold is $100,000 for both General and Working Capital Funds.

e. Prior to FY 1996, the capitalization threshold was less than $100,000 and varied according to the year the item was acquired. Such PP&E shall remain capitalized and subject to depreciation for WCF activities. However, for General Fund activities, all PP&E that was capitalized prior to FY 1996 costing less than $100,000 was written off as a prior period adjustment in FY 1998. Therefore, such amounts no longer shall be capitalized or depreciated.

f. Bulk purchases of General PP&E, that individually meet the capitalization threshold, shall be capitalized and recorded in a property accountability system that is capable of computing depreciation or interfaces with a system that is capable of computing depreciation. If the per item cost of a bulk purchase does not meet the capitalization threshold, such PP&E shall be expensed in the period acquired. Applying this policy, a bulk purchase totaling $800,000 could either be capitalized or expensed depending on the cost of the individual items purchased. If such purchase consisted of 8 items costing $100,000 each, each of the items would be capitalized. If the purchase consisted of 80 items valued at $10,000 each, the entire amount would be expensed. In both examples, all of the items would be recorded in the activity's property accountability system. If a bulk purchase is made that has a material effect on a DoD Component's financial statements, that Component may request, in writing, a waiver to this policy. Such a waiver shall be addressed to the Under Secretary of Defense (Comptroller).

2. General PP&E also includes:

a. Assets acquired through capital leases, including leasehold improvements (see paragraph 060207 of this Chapter);

b. Property owned by the reporting entity even though it may be in the possession of others (e.g., state and local governments, colleges and universities, or contractors);

c. Land, other than Stewardship Land (see paragraph D below) with an identifiable cost that was specifically acquired for, or in connection with, the construction of General PP&E;

d. Land rights, which are interests and privileges held by an entity in land owned by others, such as leaseholds, easements, water and power rights, diversion rights, submersion rights, rights-of-way and other like interests in land.

3. General PP&E excludes items:

a. Held in anticipation of physical consumption such as operating materials and supplies (this includes material furnished to a contractor to use in the production of a weapons system);

b. That the Department has a reversionary interest in. For example, the Department sometimes retains an interest in PP&E acquired with grant money in the event that the recipient no longer uses the PP&E in the activity for which the grant was originally provided and the PP&E reverts to the Department;

c. Stewardship assets (as described in paragraphs B, C and D below) and

d. Stewardship investments (nonfederal physical property).

4. General PP&E is used in providing goods or services and typically has one or more of the following characteristics:

a. It could be used for alternative purposes (e.g., by other DoD or federal programs, state or local governments, or nongovernmental entities), but it is used to produce goods or services, or to support the mission of the entity, or

b. It is used in business-type activities, or

c. It is used by entities in activities whose costs can be compared to those of other entities performing similar activities (e.g., federal hospital services in comparison to commercial hospitals).

5. For all WCF activities, all PP&E used in the performance of their mission shall be categorized as General PP&E, whether or not the PP&E meets the definition of any other PP&E category. For stewardship assets coincidentally located on a WCF installation, those assets shall be reported on the General Fund stewardship report for the Military Department that owns that installation.

6. Further discussion of General PP&E accounting policy begins at paragraph 060104.

B. National Defense PP&E (ND PP&E). ND PP&E are the PP&E components of weapons systems and support PP&E used by Military Departments in the performance of military missions and vessels held in a preservation status by the Maritime Administration's National Defense Reserve Fleet. Further discussion of ND PP&E accounting policy begins at paragraph 060303.

C. Heritage Assets. Heritage Assets are PP&E that are unique for one or more of the following reasons: historical or natural significance; cultural, educational or artistic (e.g., aesthetic) importance; or significant architectural characteristics. Heritage Assets are generally expected to be preserved indefinitely. See paragraph 060304 for the accounting policy on Heritage Assets.

D. Stewardship Land. Land not acquired for, or in connection with, General PP&E is Stewardship Land. "Acquired for or in connection with" is defined as including land acquired with the intent to construct General PP&E and land acquired in combination with General PP&E, including not only land used as the foundation, but also adjacent land considered to be the common grounds to General PP&E. Without exception, all land provided to DoD from the public domain, or at no cost, shall be classified as Stewardship Land, regardless of its use. Therefore, public domain or no-cost land used in a General PP&E context shall be classified as Stewardship Land, not as General PP&E land. See paragraph 060305 for the accounting policy on Stewardship land.

060105. Recognition of General PP&E

A. General.

1. All General PP&E assets acquired by DoD must be recognized for accounting and reporting purposes. Recognition requires the proper accounting treatment (expense or capitalization and depreciation) and the reporting of capitalized amounts and accumulated depreciation on the appropriate DoD Component's financial statements. The DoD Component that procures a General PP&E asset, or DoD Component in possession of a General PP&E asset, usually, but not always, will be DoD Component that must account for and report the asset. The following guidance shall be used to determine which DoD Component is required to account for and report General PP&E assets.

2. In most instances, a General PP&E asset shall be recognized by DoD Component acquiring the General PP&E asset. The exception to this requirement is based on the concept of the preponderant use and is explained in paragraph 060105.B.

a. Recognition shall occur when title passes to the acquiring DoD Component or when the asset is delivered to DoD Component or to an agent of DoD Component (whichever occurs first).

b. In the case of a constructed General PP&E asset (e.g., a building), the cost to construct the asset shall be recorded as construction-in-progress until the asset is completed and placed in service. In the case of a building, the placed in service point shall be the date that the building is occupied, commonly called the beneficial occupancy date, regardless of whether the building has been officially transferred, or whether final payment has been made and the contract closed out. When the building is occupied, the balance in the construction-in-progress account shall be transferred to the appropriate General PP&E account. The balance transferred can be adjusted later, if necessary, once the final payment has been made and the contract closeout process has been completed.

c. For General PP&E assets acquired by a contractor on behalf of a DoD Component (e.g., DoD Component that will ultimately hold title to the assets), the assets shall be recognized upon delivery or constructive delivery, whether to the contractor performing the service, or to DoD Component. Delivery or constructive delivery shall be based on the terms of the contract regarding shipping and/or delivery.

3. WCF activities are required to recognize and depreciate General PP&E assets in accordance with the guidance in this Chapter without regard to whether such assets are procured through a WCF activity's Capital Purchase/ Investment Program budget or whether depreciation for such assets is included in rates charged to customers. Therefore, the recognition of General PP&E assets and the depreciation of such assets by WCF activities may be different for financial statement reporting purposes than the depreciation amounts used for WCF rate development and budget presentation. All General PP&E depreciation of WCF activities shall be recognized as an expense on the annual Statement of Net Cost, reflected in the Statement of Changes in Net Position, included in accumulated depreciation amounts on the Balance Sheet, and reported in monthly AR 1307 reports. Defense WCF rates charged to customers are based on guidance in Volume 2B and Volume 11B of this Regulation.

4. To establish proper PP&E accountability, when acquiring General PP&E from another DoD Component or federal agency, the acquiring DoD Component shall request, from the losing DoD Component or other federal agency, the necessary source documents to establish the location, original acquisition cost, cost of improvements, the date the asset was purchased, constructed or acquired, the estimated useful life, the amount of accumulated depreciation, the condition if desired, etc. If this information is not available, estimates may be necessary and must be documented.

B. Treatment When the Preponderant User of an Asset Is Not the Owner or DoD Component that Financed the Asset. Legal ownership (i.e., having title to a General PP&E asset), usually, but not always, is the determinant factor when determining which DoD Component recognizes a particular General PP&E asset for accounting and reporting purposes in annual financial statements. Likewise, how a real property asset was financed does not in itself determine what entity accounts for and reports a real property asset. For example, buildings used by a WCF activity may not have been constructed or acquired with WCF funds. However, such buildings generally

should be capitalized and depreciated by the WCF activity and reported on the WCF activity's annual financial statements. Such accounting and reporting is required by WCF activities regardless of whether title to such buildings is passed to the local installation when construction is completed. When determining which DoD Component must recognize a General PP&E asset for accounting and financial statement reporting purposes, all four of the following criteria must be met by the recognizing DoD Component:

1. The General PP&E asset must embody a probable future benefit that will contribute to DoD Component's operations. In applying this criterion, the concept of benefit has traditionally been referred to as "service capacity" (e.g., the ability of an asset to directly assist DoD Component in achieving its mission). Service capacity has value because it is consumable or exchangeable for other benefits. For example, a building on a military installation used by a Defense Agency provides space for its operations, allowing it to achieve its mission. The Defense Agency also pays for utilities, maintenance and upkeep of the building. The exchangeability part of the benefit criterion (the ability to sell, trade or donate the property) need not be present for an item to qualify as an asset in the federal sector, if use of the item provides benefit to DoD Component. The inability of DoD Component to exchange the benefit for other benefits does not preclude the asset from meeting this criterion.

2. The DoD Component that reports the General PP&E asset must be able to obtain the benefit and control access to the benefit inherent in the asset. This criterion, control over the benefit, refers to an entity's ability to direct who derives the benefit, the timing of when the benefit is derived and under what conditions it is derived. Directing the use of the benefit has traditionally been based on possession or the ability to exert significant influence over the benefits; either of which is obtained through legal ownership or an agreement with the owner. In instances when an entity maintains possession of property through agreements that provide for possession for as long as needed, without a termination date, and without reimbursement, such arrangements are generally considered as providing sufficient influence over the use of the property to satisfy the control criterion. Once termination occurs, however, as in the case of a base closing where an entity conducts operations, control no longer exists; hence, the property will no longer meet the control criterion for the asset. For further policy regarding treating assets on military bases slated for closing, see paragraph 060211 of this Chapter.

3. The transaction or event giving a DoD Component the right to, and control over, the benefit of a General PP&E asset must have already occurred. This criterion is an agreement (express or implied) that allows a DoD Component to occupy and use the asset without reimbursement for as long as needed.

4. DoD Components shall only report predominately used General PP&E assets owned by other DoD Components when the cost of those assets, taken as a whole, are material to the predominant user Component's financial statements. This is in keeping with the concept that each entity's full cost should incorporate the full cost of goods and services that it receives from other entities. The recognition of full cost

is limited to material items or amounts that are significant to the receiving entity and form an integral or necessary part of the receiving entity's output. Specific examples below illustrate how this policy should be implemented.

a. Military Departments – General Fund. Generally, a Military Department shall not recognize or report facilities occupied on another Military Department's installation. For example, if the Air Force is a tenant on an Army installation, and the Air Force is the predominant user of a building on that installation, the Army should report the building on the Army's financial statements--not the Air Force. This policy recognizes that the Military Departments routinely use each other's facilities in the normal course of carrying out their missions, and the net effect of this "cross use" of facilities is not material to the Military Departments' financial statements.

b. Defense Agencies – General Fund. The Defense Agencies that produce financial statements and/or are included in DoD Consolidated Financial Statements generally must recognize and report the facilities used in their operations. The facilities are material to the performance of their mission. Most facilities used by the Defense Agencies are owned by, or titled to, the Military Departments. Generally, these facilities are significant to the operation of the agencies and form an integral or necessary part of their output. As such, these facilities are material to the Defense Agencies' financial statements and shall be reported on the annual financial statements of the Defense Agencies and excluded from the financial statements of the Military Departments. The Defense Agencies and Military Departments shall coordinate with each other to ensure completeness and avoid duplicate reporting of General PP&E.

c. Working Capital Funds.

(1) General. When a WCF activity is the preponderant user of a facility, that WCF activity shall report and depreciate that facility on its annual financial statements. This requirement exists without regard to whether the WCF activity belongs to a Military Department or a Defense Agency.

(2) Preponderant Use and Improvements. WCF activities funding capital improvements shall report and depreciate such improvements on their annual financial statements, whether or not the WCF activity is the preponderant user of the facility improved. For example, if the Defense Logistics Agency (DLA) occupies a facility with an Army activity and occupies less square footage in the facility than the Army, but makes a capital improvement to its portion of the facility, the improvement should be recorded in the applicable property records, and the DLA should report and depreciate the improvement on the DLA financial statements. The same accounting treatment and reporting requirement shall apply if in the above example DLA is the preponderant user of the facility improved.

d. Medical Facilities and Equipment. The preponderant use policy outlined above shall not apply to DoD medical activities. While most of the funding for medical activities is centralized through the Office of the

Assistant Secretary of Defense (Health Affairs) (OASD[HA]), the OASD(HA) does not exercise command and control authority over medical activities. Hospitals, clinics and other medical facilities are typically located on a military installation or are otherwise under the command and control of one of the Military Departments. The essence of the medical mission of such facilities is to serve the personnel and families working at, or living near, military installations. Therefore, the military installation is the preponderant user of the medical facility, and all medical General PP&E equipment and facilities shall be reported on the annual general fund financial statements of the Military Department that owns the installation upon which a medical facility resides. This policy is applicable to General PP&E purchased with General Funds regardless of Department Fund Code (e.g., TI 17, 21, 57, or 97).

C. Facilities and Equipment Outside the Continental United States (OCONUS).

1. OCONUS facilities that are occupied, and equipment that is used, by DoD Components shall be recognized as General PP&E of the occupying/using DoD Component for accounting and financial reporting purposes, if such occupation/use meets all of the following criteria. If any of the criteria are not met, the asset shall not be recognized by DoD Component.

a. The facilities are occupied or equipment is used without reimbursement to the host nation,

b. The DoD Component controls access to or use of the facility or equipment,

c. Use of the facility or equipment is for an unspecified length of time, and

d. The DoD Component maintains and repairs the facility or equipment.

2. Such OCONUS facilities and equipment include facilities and equipment that were confiscated during military operations, facilities built or equipment procured with the funds of international organizations (e.g., the North Atlantic Treaty Organization) and facilities that were built or equipment procured with the funds of host countries. The fact that such facilities or equipment may be returned to the host country or international organization when DoD Component permanently leaves such facilities or returns equipment is not a relevant factor for purposes of accounting and financial statement reporting. Due to the unique nature of this type of property, and the fact that it will eventually be returned, the reporting Component has some latitude in the reporting of such property. Specifically, if the property is recorded in the property accountability or accounting records without a historical acquisition cost or estimate, and the property would be substantially or fully depreciated, no effort shall be made to determine an estimated acquisition cost. However, DoD Components must comply with

all property accountability policies and requirements, as well as comply with appropriate accounting and reporting requirements when capital improvements are made to such property.

3. Such facilities and equipment are not to be considered assets under a capital lease, unless a specific agreement with the host country exists, and the agreement is the equivalent of an installment purchase and meets one of the criteria for a capital lease as specified in paragraph 060207 of this Chapter.

4. The quantity and/or value of such OCONUS facilities and equipment and the unique convertible nature of them shall be disclosed in the General PP&E narrative section (footnotes) of DoD Component's annual financial statements.

D. Recognition Uncertainty.

1. It is important that the overall accounting records of the Department of Defense and the federal government are not duplicative and that DoD Component responsible for an asset maintains accountability for that asset. In situations where doubt exists as to which DoD Component should recognize an asset, DoD Components involved shall reach agreement with the other applicable DoD Components or federal agencies as to which entity will recognize the PP&E.

2. If an agreement cannot be reached, the matter shall be referred to the Office of the Deputy Chief Financial Officer, Office of the Under Secretary of Defense (Comptroller), for resolution. Requests for resolution shall be accompanied by adequate supporting documentation to assist in resolution of the matter and be submitted through the Financial Management and Comptroller of the submitting Military Department or Defense Agency.

060107. Physical Inventories of PP&E

The DoD Components must perform periodic physical inventories of PP&E. General PP&E personal property and Heritage Assets shall be inventoried at least every 3 years. General PP&E real property and Stewardship Land shall be inventoried at least every 5 years. National Defense PP&E weapons and weapons systems shall be inventoried at a minimum once a year. National Defense PP&E principle support and mission support items must be inventoried at least every 3 years. Contractors in possession of government property are exempt from this inventory policy. Contractors are subject to Federal Acquisition Regulation property accountability requirements.

A. Physical inventories shall be taken to ensure, among other things, that DoD PP&E is:

1. At the location identified in the property accountability records or system, or if the PP&E is mobile, who (individual, organization, or both, as appropriate) the PP&E custodian is and where the PP&E custodian is located,

2. As described in the property records, and

3. In the condition described in the property records.

B. Results of the physical inventories shall be reconciled to the property accountability records and/or systems. Differences shall be researched and any adjustments shall be fully documented. Adjustments may be required for any unrecorded physical changes such as removals, additions, or modifications of the PP&E that were not previously or properly recorded.

C. PP&E assets not in use may be inventoried using statistical sampling, as discussed in Chapter 4 of this Volume. PP&E assets in use and all real property shall be subject to a 100 percent physical inventory. The physical inventories shall be scheduled so that all PP&E items are identified and pertinent information validated within the timeframes established in this subsection.

D. Care must be taken to consider PP&E due-in and in-transit to the organization before reaching any conclusions that the property accountability records are accurate (or inaccurate).

E. Adjustments to property accountability records, systems and financial records shall be made only for those PP&E items where the physical identification/count disclosed discrepancies. Such adjustments shall be supported by reports of survey prepared in accordance with Chapter 7, "Financial Liability for Government Property, Lost, Damaged, or Destroyed," of Volume 12 of this Regulation. Adjustments resulting from previously unrecorded modifications or alterations also shall be supported by documentation showing the costs of the changes.

F. Adjustments to the general ledger accounts to record PP&E found during the conduct of physical inventories shall be recorded under the appropriate Standard General Ledger (SGL) accounts for PP&E (1700 series), as detailed in Section 0602 of this Chapter, or for losses, under "Other Losses" (SGL Account 7290).

060109. Deferred Maintenance

The DoD Components must disclose in annual financial statements material amounts of deferred maintenance on PP&E. The specific financial statement reporting requirements are contained in Volume 6B of this Regulation.

A. Definitions.

1. Deferred maintenance is maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed to a future period.

2. For purposes of this policy, maintenance is described as the act of keeping PP&E assets in an acceptable condition. Maintenance includes preventive maintenance, normal repairs, replacement of parts and structural components and other activities needed to preserve the asset so that it continues to provide acceptable service and achieves its expected life.

3. Maintenance excludes activities aimed at expanding the capacity or capability of an asset or otherwise upgrading it to serve needs different from, or significantly greater than, those originally intended.

B. Disclosure Requirements.

1. Deferred maintenance amounts must be reported in annual financial statements for General PP&E real property that have a cost that equals or exceeds DoD capitalization threshold (see paragraph 060103.A.1.d of this Chapter).

2. The DoD Components do not normally have material amounts of deferred maintenance on General PP&E personal property. Therefore, DoD Components generally shall not report General PP&E deferred maintenance in annual financial statements. However, if a DoD Component does incur a material amount of deferred maintenance on General PP&E personal property, then such amounts should be disclosed in DoD Component's annual financial statements.

3. For annual financial statement reporting purposes, DoD has neither maintenance nor deferred maintenance on land or Heritage Asset collection items.

4. Maintenance of National Defense PP&E is accomplished by two different, yet complementary components--depot-level maintenance activities and field-level maintenance activities. For the purposes of this policy, the term "field-level maintenance" includes all nondepot-level maintenance activities (e.g., organizational, intermediate and regional).

a. Depot-Level Maintenance. Depot-level maintenance includes: major repair, overhaul or complete rebuilding of weapons systems, end items, parts, assemblies and subassemblies; manufacture of parts; technical assistance; and testing. Material amounts of depot-level deferred maintenance due to the unavailability of funding and/or capacity constraints have been historically reported through the Department's budget process by the Military Departments. Such amounts are provided annually to the Congress in the President's Budget submission and also satisfy the intent of the federal accounting standard definition. The same budget submission amounts shall be reported in the annual financial statements of the Military Departments.

b. Field-Level Maintenance.

(1) Field-level maintenance comprises maintenance activities at lower organizational levels than depot-level. The Military

Departments may or may not separate this level of maintenance into intermediate and organizational maintenance activities when describing the field-level maintenance structure and capability.

(a) Intermediate field-level maintenance includes limited repair of commodity-oriented components and end items; job-shop, bay and productionline operations for special mission requirements; repair of printed circuit boards; software maintenance; and fabrication or manufacture of repair parts, assemblies and components. The intermediate maintenance mission is to sustain the combat readiness and mission capability of supported activities by providing quality and timely materiel support at the nearest location with the lowest practical resource expenditure.

(b) Organizational field-level maintenance is normally performed by an operating unit on a day-to-day basis in support of its own operations. The organizational maintenance mission is to maintain assigned equipment by performing functions such as inspections, servicing, preventive maintenance and corrective maintenance.

(2) Generally, any year-end amounts of field-level deferred maintenance on National Defense PP&E, whether at the intermediate field-level or organizational field level, have been determined to be immaterial in amount, when compared to depot-level amounts of deferred maintenance. Therefore, the Military Departments shall not report field-level deferred maintenance amounts.

C. Measurement of Deferred Maintenance. The method used to determine the estimated amounts of deferred maintenance must be disclosed in the narrative statement to the Required Supplementary Information Deferred Maintenance Report in DoD Component annual financial statements. The federal-wide accounting standard permits the use of:

1. Cost Assessment Surveys. If this method is used, the following information should be presented for each major class of PP&E:

a. Description of the requirement or standards for determining an acceptable operating condition,

b. Any changes in the condition requirements for acceptable operating condition,

c. Information on the condition of the assets, either in narrative form or through the use of descriptive statistics (e.g., percentage of assets above, at or below acceptable condition or averages of standardized condition rating codes), and

d. A range or point estimate of the dollar amount of maintenance needed to return the assets to an acceptable operating condition.

2. Life Cycle Cost Forecasts. If this method is used, the following information should be presented for each major class of PP&E:

a. The date of the maintenance forecast,

b. The prior year balance of the cumulative deferred maintenance amount,

c. The dollar amount of the maintenance requirement estimated for the reporting period,

d. The dollar amount of the maintenance actually performed during the period,

e. The difference between the forecast and actual maintenance,

f. Any adjustments to the scheduled amounts deemed necessary, and

g. The ending cumulative balance for the reporting period for each major class of asset experiencing deferred maintenance.

3. Other methods may be used to estimate the amount of deferred maintenance and should be accompanied by information that describes the method.

Table of Recovery Periods from 060206

DoD RECOVERY PERIODS FOR DEPRECIABLE GENERAL REAL PROPERTY ASSETS (Excludes National Defense PP&E and Heritage Assets)

Description of General Real Property Assets	Recovery Period
Improvements to 20-Year Recovery Period Property	10 Years
Steam (12.5K pounds per hour or more) and Electric Generation Equipment (500 Kilowatt or more), Sewers and Other Utilities (including such things as fiber optic cable) Fences, Roads, Bridges, Towers, Ship and Railroad Wharves and Docks, Dry Docks, Fuel Storage Facilities and Other Real Property Structures. Improvements to 40-Year Recovery Period Property	20 Years
Buildings, Hangers, Warehouses, Fuel Storage Buildings, Air Traffic Control Towers and Other Real Property Buildings	40 Years
Improvements to Leased Buildings and Other Real Property (Leasehold Improvements)	Remainder of Lease Period or 20 Years Whichever Is Less
Land Rights of Limited Duration	Over the Specified Duration

APPENDIX C: List of Applicable Audits and Reports

1. Reports on Real Property Inventory and Accountability

a) U.S. General Accounting Office. *Reporting Weaknesses Impede Management Decision Making* (GAO/AIMD-94-9, November 11,1993 [Letter Report]).

b) U.S. General Accounting Office. *CFO Act Financial Audits: Navy Plant Property Accounting and Reporting Is Unreliable* (GAO/AIMD-96-65, July 8, 1996 [Letter Report]).

c) U.S. General Accounting Office. *Defense Infrastructure: Historic Properties within the Department of Defense,* (GAO-01-497T, March 15, 2001)

d) Department of Defense, Office of the Inspector General. *Implementation of the Defense Property Accountability System Executive Summary* (DoD Report No. 98-135, May 18, 1998).

e) Department of Defense, Office of the Inspector General. *Reliability of the Military Departments Real Property Databases for Existence and Completeness* (Report No. 99-243, August 27, 1999).

f) Department of Defense, Office of the Inspector General. *Accuracy of the FY 1999 Additions, Deletions, and Modifications to the Military Departments' Real Property Databases* (Report No. D-2000-172, Date: August 11, 2000).

g) Department of Defense, Office of the Inspector General. *Audit Accuracy of the Government-Owned Contractor-Occupied Real Property in the Military Departments' Real Property Databases Executive Summary* (Report No. D-2001-026, December 22, 2000).

h) U.S. Army, U.S. Army Audit Agency. *Army's Principal Financial Statements for Fiscal Years 1997 and 1998, Financial Reporting of Real Property, Natural Resources and Leases,* (Audit Report: AA 98-174, 11 May 1998).

i) U.S. Army, U.S. Army Audit Agency. *Army's Principal Financial Statements for Fiscal Year 1998, Reliability of Source Information for the Financial Reporting of Real Property,* (Audit Report: AA 99-228, 20 April 1999).

j) U.S. Army, Office of the Assistant Chief of Staff for Installations Management. *Utility Study Executive Summary,* August 1999.

k) U.S. Army, U.S. Army Audit Agency. *Property, Plant and Equipment, Army Working Capital Fund FY 99 Financial Statements,* (Audit Report: AA 00-418, 29 September 2000).

l) Department of the Navy, Navy Audit Service. *Department of the Navy Working Capital Fund, FY 99 Real Property*, (Report Number: 1999-0155, 11 Apr 2000).

m) Department of the Navy, Navy Audit Service. *Department of the Navy Principal Statements for FY 1999: Reporting of Real Property (Buildings, Structures, and Facilities)*, (Report Number 1999-0142, 12 May 2000).

n) Department of the Navy, Navy Audit Service. *Department of the Navy Working Capital Fund FY 1999 Real Property Audit*, (N2000-0038, 28 August 2000).

o) Department of the Navy, Navy Audit Service. *Department of the Navy Principal Statements for FY 1998: Class 1 and 2 Plant Property*, (Report Number: 99-0081, 24 May 1999).

p) Air Force Audit Agency. *Accounting for Air Force Real Property, Fiscal Year 1999 Audit Report* (99053006, 24 August 2000).

q) Air Force Audit Agency. *Air Force Working Capital Fund Real Property Audit Report* (99068002, 18 August 2000).

2. Reports on Defense Real Property Management

a) U.S. General Accounting Office. *Real Property Management: Reforms in Four Countries Promote Competition* (GAO/GGD-94-166, September 30, 1994 [Chapter Report]).

b) U.S. General Accounting Office. *Management Reform: GAO's Comments on the National Performance Review's Recommendations* (GAO/OCG-94-1, December 3, 1993, [Letter Report]).

c) U.S. General Accounting Office. *Military Infrastructure: Real Property Management Needs Improvement*, U.S. Senate, September 1999.

APPENDIX D: Inventory System Descriptions

Army Systems

IFS-C/S Integrated Facilities System – Client/Server

An Army standard system that encompasses the life-cycle management of the US Army's real property resources, and provides information on all aspects of facility engineering activities. It provides Directorate of Public Works (DPW) divisions, branches and shops with function information for their operational and reporting requirements. Business areas covered include real property accounting, work reception, job cost accounting and utility billing, work estimating, contract administration, supply management and property book management. Also includes IFS-M Supply that automates inventory control and supply management at the installation.

HQEIS Headquarters IFS Executive Information System

EIS is an automated way of looking at information from multiple existing data sources in a user friendly format. Data is displayed based on interactive queries (SQL) on standard screen displays, which can answer most frequently asked questions. The Army has designed a family of EIS's: Installation EIS (I-EIS) and Headquarters IFS EIS (HQEIS) to help facility managers at all levels obtain data for decision making.

The HQ EIS is a user friendly method for Headquarters, Department of Army (HQDA), Major Army Commands (MACOM), Office of the Secretary of Defense (OSD), Army Installations, Corps Divisions/Districts and DoD contractors to acquire Army facility information from IFS and other existing databases. The EIS is designed to allow users easy access to data without knowledge of Structured Query Language (SQL) or specialized computer skills. It is a multidimensional database that provides standard graphical, tabular and spatial displays for multiple levels and fiscal years. These displays allow users at all levels a means of accessing and analyzing their Real Property Inventory, Real Property Maintenance Activity (RPMA) costs, Leases, Military Construction Projects, etc.

The EIS has minimal hardware and software requirements for the user. The HQEIS architecture uses a 3-tiered approach. This approach requires each user to load minimal software (2.5MB) on their PC to access the USACE, Military Programs, Installation Support Division (ISD) communications server (Microsoft Terminal). The communications server provides the HQEIS software and all software necessary to connect to the HQEIS database server. The HQEIS Microsoft Terminal server can be

accessed using an Internet and CITRIX ICA Client software. The HQEIS database resides on a quad Pentium processor.

HQEIS (which includes the GIS module) displays data from existing databases and sources such as: Integrated Facilities System (IFS), Army Stationing Installation Plan (ASIP), Facility Reduction Program (FRP), McKinney Act, Technical Data Report (TDR) for FY97 and prior, Service Based Costing for FY96 and future, FRP Credits (ACSIM), Headquarters Installation Status Report (HQISR), Lease Management Database (LMD) and Construction Appropriations Programming, Control and Execution System (CAPCES). HQEIS data is updated as often as the updates are available from the data source. The system will default to the most current FY of data available. Standard screens were designed to answer 80 to 90 percent of typical questions. On-line tools allow the user to copy EIS screens or data to a clipboard, export data to a file, or print tables or screens.

Future EIS development includes aggregating Real Property data by Army Controlled/Army Owned/Army Owned but Controlled by Others/Privately Owned in addition to Army Managed, and GIS enhancements to include installation footprints.

PRIDE Planning Resource for Infrastructure Development and Evaluation

A commercial software package purchased and being adapted by the Army National Guard. PRIDE is a product from Peregrine Systems and the integrator is Anteon Corp. PRIDE System characteristics are:

- Windows NT;
- Oracle/Oracle Compatible DB Management System;
- Can be Web Based – provides two web-based products that allow users to access database information as well as create and submit work requests;
- LAN/WAN Compatible;
- Meets General Ledger Accounting Codes;
- Spatial Management Capability – space analysis imports, processes data and develops a model to determine the most effective space planning; and
- Open Expandable Architecture.

The ARNG uses PRIDE to maintain its inventory of real property, including leased, state- and federally-owned properties. While PRIDE possesses the following functional capabilities, the ARNG has only implemented Property Portfolio, Lease Management and Project Management.

- Real Property Inventory – Property Portfolio and Lease Management
- Real Estate Management – Property Portfolio
- Work Order/Service Order Processing

- Budgeting
- Criteria
- Project Management
- Master Planning
- Financial Management – Budget Manager
- Document Manager
- CAD Design System Viewing – CAD Integrator and Standardization
- Depreciation of Real Property

Navy Systems

iNFADS **Internet, Navy Facilities Assets Data Store**

The real property database of record for the Navy is iNFADS. In 1970, the Chief of Naval Operations (CNO) assigned responsibility for the technical direction of the Department of Navy (DON) real property inventory to the Commander, Naval Facilities Engineering Command (COMNAVFACENGCOM). This included the responsibility to establish a system and issue the procedures necessary to meet the inventory and reporting requirements of DoDI 4165.14 and FPMR 101-3. NAVFACENGCOM established the iNFADS that provides information required by the DON for facilities planning and management. iNFADS contains data on each existing facility (building, structure, utility and land) owned or leased by the DON. Data is provided on the facility, location, acquisition, construction, size, cost, capacity, utilization and condition. The database contains approximately 193,000 items of real property as of 30 Sep 2000.

The following data systems are used by iNFADS:

a. Master Activity General Information Control (MAGIC). iNFADS annual reports are sorted and distributed by using data contained in the MAGIC database.

b. The Category Code Directory (CCD).

CCD **Category Code Directory**

An automated file containing DON facility category codes, descriptions and units of measure. It is used for identifying, classifying and quantifying assets. The file contains the investment category and maintenance cost account numbers corresponding to each of the facility category codes.

MAGIC Master Activity General Information Control

A single database of information on Navy activities and those units of the operating forces that require significant logistics support from those activities. The MAGIC system has been in operation since 1971. NAVFACENGCOM has administered the MAGIC database with a view toward standardization of activity related information through centralized data collection and quality control. The MAGIC database contains data critical to the proper operation of the SFPS and the iNFADS.

Air Force Systems

ACES-RP Automated Civil Engineer System - Real Property Module

Provides real property information management support to active Air Force, Air National Guard and Air Force Reserve units during peace and war, at fixed main bases, bare bases and deployed locations. ACES is a relative new system that will eventually replace the Intermediate Work Information Management System (IWIMS) which is a replacement for the Work Information Management System (WIMS). The Real property module is the first module to be fielded. IWIMS will be phased out over the next three to five years. ACES-RP is an Oracle client-server based product.

APPENDIX E: Comparison of DoDI 4165.14 Data with Existing Systems' Data

The darft DoD Instruction 4165.14 identifies the real property inventory data that DoD wants to receive electronically from each of the Military Department's inventories. The proposed DoDI 4165.14 data elements and definitions are listed in columns one and two in Table 1 below. The other three columns illustrate the extent to which the data currently available to via each of the Military Department's system can be mapped to DoDI data elements. The purpose is to identify how many of the proposed data elements exist in each of the systems and how useable the data is in its current configuration, e.g. standardized data definition, format, etc. The following color-coding scheme is used to visually display the results:

- Green (OK) indicates the data is available and conforms to the data definition, data size and data format;
- Yellow (?) indicates the data was found and meets the minimal data standardization criteria, but one or more of standard definition, data size, or data format did not match DoDI 4165.14; and
- Red (X) indicates DoDI 4165.14 data element was not found in the database.

Table 1 - DoDI 4165-15 – Real Property Inventory Data Mapping to Military Departments' Systems

DoDI 4165.14 Data Elements	DoDI Definitions	ARMY IFS	NAVY iNFADS	AF ACES-RP
1. Reporting Military Service	The Military Department or WHS with responsibility for real property accountability at a given site will be DoD reporting component.	✓	✓	✓
2. Facility Number/Number Code	A unique code assigned by the Service to denote a specific facility with a distinct CATCODE or multiple CATCODEs.	✓	✓	✓
3. Site Number/Code	The number/code, assigned by the Military Department or WHS to identify the site where the facility is located.	✓	✗	✓
4. Interest Code	A code that defines the government's legal or financial stake, right, or title to a facility (e.g., owned or leased).	✓	✓	✓
5. Service CATCODE	A Service-unique code that denotes the function of the facility. CATCODEs are based upon DoDI 4165.3 guidelines.	✓	✓	✓

Table 1 - DoDI 4165-15 – Real Property Inventory Data Mapping to Military Departments' Systems				
DoDI 4165.14 Data Elements	**DoDI Definitions**	**ARMY IFS**	**NAVY iNFADS**	**AF ACES-RP**
6. Value in primary Unit of Measure (UM)	The facility size in the FAC UM.	✓	✓	✓
7. Primary UM	The two-digit alpha code for the FAC UM.	✓	✓	✓
8. Value in Second UM (optional)	Where established by the CATCODE, the facility size in capacity or other UM.	✓	✓	✓
9. Second UM	The two-digit alpha code for the capacity or other UM.	✓	✓	✓
10. Value in Third UM (optional)	Where established by the CATCODE, a facility size in the third UM.	Not Used	✓	Not Used
11. Third UM	The two-digit alpha code for the third UM.	Not Used	✓	Not Used
12. Construction Type	Describes the construction criteria/material used in the facility includes construction type (Permanent, Semi-Permanent, or Temporary) construction criteria and the structural construction material used. An entry from each table is required for each reportable facility.	✓	✓	?
13. Fiscal Year Built	The fiscal year in which construction was completed.	✓	✓	✓
14. Fiscal Year Acquired	The fiscal year in which the facility was acquired by the reporting agency.	✓	?	✓
15. Recorded Costs	The sum of all capital improvement costs for the life of the facility to include the original acquisition cost.	✓	✓	✓
16. Plant Replacement Value (PRV)	The replacement cost of a facility, to the five-foot line, calculated in today's dollars with today's standards for design and construction. It includes supervision, inspection and overhead (SIOH) costs as well as design costs. PRV is calculated by DoD component using the OSD-developed formula as follows: PRV=(Facility Quantity X Construction Cost Factor X Area Cost Factor) X 1.2, where Facility Quantity is the Primary Unit of Measure quantity; Area Cost Factor is the adjustment applied for geographical location; and 1.2 is a 20% adjustment for SIOH and design costs.	✓	✓	✓

Table 1 - DoDI 4165-15 – Real Property Inventory Data Mapping to Military Departments' Systems				
DoDI 4165.14 Data Elements	**DoDI Definitions**	**ARMY IFS**	**NAVY iNFADS**	**AF ACES-RP**
17. Facility Condition	The physical condition of the facility. **Editor's note: Two different facility condition-rating schemes are being considered by DoD.** These are: Condition (Good, Fair and Poor); and C-1, C-2, C-3 and C-4, which follow the Congressional Installation Readiness Report (IRR).	**TBD**	**TBD**	**TBD**
18. Facility Status	The operational status of the facility.	?	✓	✗
19. Historical Status	The historical status of the facility with respect to placement on the National Register of Historical Places.	✓	?	✗
20. Planned Disposal	The planned disposition of the facility.	✓	✓	✗
21. Planned Disposal Fiscal Year	The fiscal year in which a facility is to be disposed. Use "9999" for facilities with no planned disposal date	✓	✗	✗
22. User Code	A two-character code that identifies the user or users of a facility. In the case of buildings the user is the actual occupant(s). For structures, the user is defined as the organization that has replacement responsibility for the facility.	✓	✓	?
23. Sustainment Funding Code	A composite four-character code that identifies the responsible organization and fund type for replacement of the entire facility. The first two characters in this four-character code identify the organization. The third and fourth characters identify the fund type.	?	✓	?
24. Replacement Funding Code	A composite four-character code that identifies the responsible organization and fund type for replacement of the entire facility. The first two characters in this four-character code identify the organization. The third and fourth characters identify the fund type. Use "9999" if the facility is not to be replaced, e.g., facilities with pending disposal action or excess facilities.	✓	?	✓

Table 1 - DoDI 4165-15 – Real Property Inventory Data Mapping to Military Departments' Systems				
DoDI 4165.14 Data Elements	**DoDI Definitions**	**ARMY IFS**	**NAVY iNFADS**	**AF ACES-RP**
SITE (ALIAS SUB INSTALLATION) REQUIRED DATA				
a. Reporting Military Department or WHS	Department or WHS sending Site Report.	✓	✓	✓
b. Geographic Location (GEOLOC)	A four-character code that uniquely identifies the Site. Associated with the GEOLOC is a variety of planning attributes to include precise grid coordinates. GEOLOC's are found in a reference file of the Global Command Control System (GCCS). The GEOLOC file can be maintained via the National Military Command Center site (http://www.nmcc20a.nmcc.smil.mil/users/rfa/ref_files.html) DISA JSSC, Pentagon maintains the GEOLOC file.	✓	✓	✓
c. Site Number/Code	Service-unique number/code assigned to a specific site.	✓	✓	✓
d. Site Name	Service-unique name assigned to a specific site.	✓	✗	✓
e. Installation Number/Code	Service-unique code assigned to the installation that has real property inventory reporting control over the site.	✓	?	✓
f. Fiscal Year Acquired by DoD	Fiscal year in which the site was acquired by the Military Department or WHS.	✓	?	✓
g. Country/State	The two-character code for the country or state in which the site is located.	✓	✓	✓
h. County	In the United States the three-character code for the county in which the site is located (If not in the U.S., use "9999".)	✓	✓	✓
i. City	In the US, the four-character digit code for the metropolitan area closest to the site. (If not in the U.S., use "9999".)	✓	✓	✓
j. Site Status	The operational status of the site.	✓	✗	✓
k. Postal Zip Code	The five-character postal zip code representing the Site's primary mailing address. Use the military post office designator for overseas sites.	✓	✗	?
l. Primary Function	The primary mission function of the site.	✓	✓	✓

Table 1 - DoDI 4165-15 – Real Property Inventory Data Mapping to Military Departments' Systems				
DoDI 4165.14 Data Elements	**DoDI Definitions**	**ARMY IFS**	**NAVY iNFADS**	**AF ACES-RP**
INSTALLATION (ALIAS PARENT INSTALLATION) REQUIRED DATA				
aa. Installation Number/Code	A Service/WHS-unique code assigned to an installation that has inventory control over a single site or group of sites.	✓	?	✓
bb. Installation Name	A Service/WHS unique name assigned to a specific installation.	✓	✗	✓
cc. Major Command/ Claimant	The Service major command/claimant to which an installation is assigned. Note: WHS does not use major commands.	?	✓	?

Table 2 below provides the percentage of data elements falling into the three categories for the each of the systems: the number of service data element matches divided by the 36 DoDI data elements.

Table 2 – Data Mapping Results –
Service Real Property Systems to DoDI 4165.14 Data Requirements

	IFS*	iNFADS*	ACES-RP*	WHS
%age Data Elements Matched	92%	69%	75%	Under Development
%age Data Element Definition, Size or Format Mismatch	8%	14%	14%	Under Development
%age Data Elements Not Found	0%	17%	11%	Under Development

(*Note – because of rounding the percentages may not add to 100)

A cross-service average of 11 percent of the required data elements require modification or addition to the real property systems to achieve 100 percent standardization of the data required by DoD. Table 3 below lists the actual numbers of data element matches of the service data against the 36 data elements in the draft DoDI 4165.14.

Table 3 – Data Mapping Results –
Service Real Property Systems to DoDI 4165.14 Data Requirements

System	Same Definition, Data Size, Data Format	Data Found - One or More Mismatches in: Definition, Data Size, Data Format; or Clarification Required	Data Not Found
IFS	33	3	0
iNFADS	25	5	6
ACES-RP	27	5	4
WHS	**Under Development**	NA	NA

APPENDIX F: Draft DoD Real Property Inventory Data Model

The data model is displayed on the next page, and the entity and attribute names and definitions are provides in a table following the model.

Note that the data model contains more data elements than identified in the draft DoDI 4165.14. This model has been drafted as a more complete representation of the business environment envisioned in the strategic perspective presented in the body of the report and looks beyond today's immediate data requirements.

The following is a brief description of an IDEF1X model:

Entities are the fundamental components of a data model. They represent a set of real or abstract objects such as people, places, ideas, things, or events that have common attributes or characteristics.

- Entities are used to track data and are illustrated in the model by **boxes**. They are labeled with singular, generic nouns. The entity name is shown outside the box.
- **Square cornered boxes** depict a self-contained entity that can exist without reliance on another entity.
- **Round cornered boxes** identify dependent entities.

The property or characteristic that describes an entity is called an **attribute**. The type of characteristic and its value defines attributes.

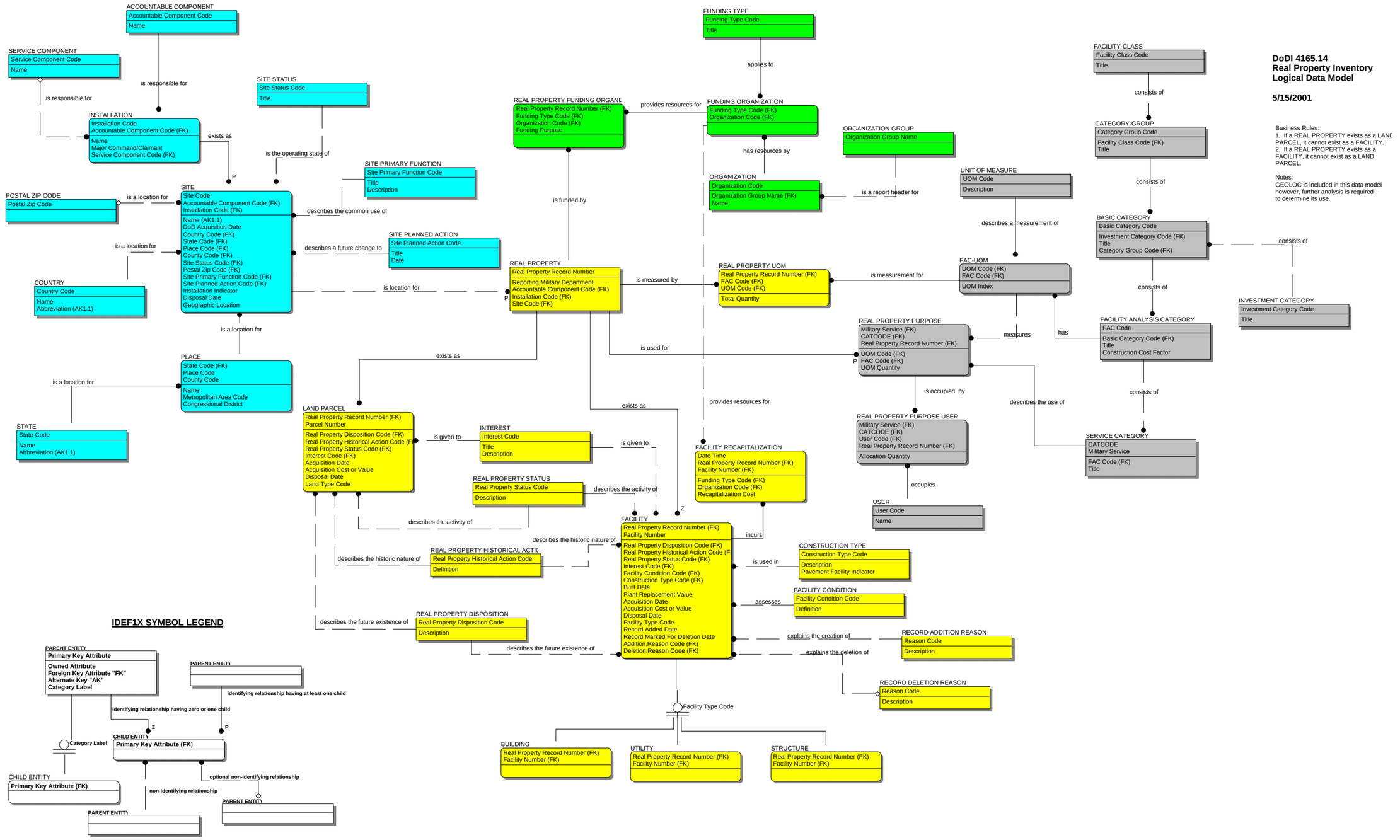
- The attribute or set of attributes that uniquely identify an entity is called a **primary key attribute,** while all other attributes are called **non-key attributes**.
- Inside the entity box, primary key attributes are shown above the line, and non-key attributes are shown below the line.

A line that connects entities related to each other defines and restricts the business rule of the connection between the two entities. The relationship is named using a verb or verb phrase describing the nature of the relationship (e.g., parent to child) and the numerical instances of the relationship. Other subtleties such as dashed lines, dots, letters and diamonds are used to further define the relationship.

The following table provides descriptions of IDEF1X Symbol Legend in the bottom left corner of the data model.

Metadata Table for IDEF1X Symbol Legend

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
CHILD ENTITY	This entity is included as part of the IDEF1X symbol legend.		Primary Key Attribute	An attribute that uniquely identifies each instance of the entity which it describes.
PARENT ENTITY	This entity is included as part of the IDEF1X symbol legend.		Primary Key Attribute	An attribute that uniquely identifies each instance of the entity which it describes.
			Owned Attribute	An attribute that exists solely in the entity it describes.
			Foreign Key Attribute "FK"	An attribute that is a primary key attribute in another entity and migrates via the relationship.
			Alternate Key "AK"	An attribute that could be used to distinguish one instance of an entity from another (similar to Primary Key Attribute).
			Category Label	An attribute used to distinguish mutually exclusive types of an entity.


ACCOUNTABLE COMPONENT
Accountable Component Code
Name
SERVICE COMPONENT
Service Component Code
Name
is responsible for
is responsible for
INSTALLATION
Installation Code
Accountable Component Code (FK)
Name
Major Command/Claimant
Service Component Code (FK)
exists as
P
SITE STATUS
Site Status Code
Title
is the operating state of
SITE PRIMARY FUNCTION
Site Primary Function Code
Title
Description
POSTAL ZIP CODE
Postal Zip Code
is a location for
SITE
Site Code
Accountable Component Code (FK)
Installation Code (FK)
Name (AK1.1)
DoD Acquisition Date
Country Code (FK)
State Code (FK)
Place Code (FK)
County Code (FK)
Site Status Code (FK)
Postal Zip Code (FK)
Site Primary Function Code (FK)
Site Planned Action Code (FK)
Installation Indicator
Disposal Date
Geographic Location
describes the common use of
describes a future change to
SITE PLANNED ACTION
Site Planned Action Code
Title
Date
is a location for
COUNTRY
Country Code
Name
Abbreviation (AK1.1)
is a location for
is location for
P
is a location for
PLACE
State Code (FK)
Place Code
County Code
Name
Metropolitan Area Code
Congressional District
is a location for
STATE
State Code
Name
Abbreviation (AK1.1)
REAL PROPERTY FUNDING ORGANI
Real Property Record Number (FK)
Funding Type Code (FK)
Organization Code (FK)
Funding Purpose
provides resources for
FUNDING TYPE
Funding Type Code
Title
applies to
FUNDING ORGANIZATION
Funding Type Code (FK)
Organization Code (FK)
has resources by
ORGANIZATION GROUP
Organization Group Name
ORGANIZATION
Organization Code
Organization Group Name (FK)
Name
is a report header for
is funded by
REAL PROPERTY
Real Property Record Number
Reporting Military Department
Accountable Component Code (FK)
Installation Code (FK)
Site Code (FK)
is measured by
REAL PROPERTY UOM
Real Property Record Number (FK)
FAC Code (FK)
UOM Code (FK)
Total Quantity
is measurement for
UNIT OF MEASURE
UOM Code
Description
describes a measurement of
FAC-UOM
UOM Code (FK)
FAC Code (FK)
UOM Index
measures
has
REAL PROPERTY PURPOSE
Military Service (FK)
CATCODE (FK)
Real Property Record Number (FK)
UOM Code (FK)
FAC Code (FK)
UOM Quantity
P
is occupied by
describes the use of
REAL PROPERTY PURPOSE USER
Military Service (FK)
CATCODE (FK)
User Code (FK)
Real Property Record Number (FK)
Allocation Quantity
occupies
USER
User Code
Name
FACILITY-CLASS
Facility Class Code
Title
consists of
CATEGORY-GROUP
Category Group Code
Facility Class Code (FK)
Title
consists of
BASIC CATEGORY
Basic Category Code
Investment Category Code (FK)
Title
Category Group Code (FK)
consists of
INVESTMENT CATEGORY
Investment Category Code
Title
consists of
FACILITY ANALYSIS CATEGORY
FAC Code
Basic Category Code (FK)
Title
Construction Cost Factor
consists of
SERVICE CATEGORY
CATCODE
Military Service
FAC Code (FK)
Title
exists as
is used for
exists as
provides resources for
LAND PARCEL
Real Property Record Number (FK)
Parcel Number
Real Property Disposition Code (FK)
Real Property Historical Action Code (F
Real Property Status Code (FK)
Interest Code (FK)
Acquisition Date
Acquisition Cost or Value
Disposal Date
Land Type Code
is given to
INTEREST
Interest Code
Title
Description
is given to
FACILITY RECAPITALIZATION
Date Time
Real Property Record Number (FK)
Facility Number (FK)
Funding Type Code (FK)
Organization Code (FK)
Recapitalization Cost
REAL PROPERTY STATUS
Real Property Status Code
Description
describes the activity of
describes the activity of
Z
FACILITY
Real Property Record Number (FK)
Facility Number
Real Property Disposition Code (FK)
Real Property Historical Action Code (FK
Real Property Status Code (FK)
Interest Code (FK)
Facility Condition Code (FK)
Construction Type Code (FK)
Built Date
Plant Replacement Value
Acquisition Date
Acquisition Cost or Value
Disposal Date
Facility Type Code
Record Added Date
Record Marked For Deletion Date
Addition.Reason Code (FK)
Deletion.Reason Code (FK)
incurs
describes the historic nature of
describes the historic nature of
REAL PROPERTY HISTORICAL ACTI
Real Property Historical Action Code
Definition
is used in
CONSTRUCTION TYPE
Construction Type Code
Description
Pavement Facility Indicator
assesses
FACILITY CONDITION
Facility Condition Code
Definition
describes the future existence of
REAL PROPERTY DISPOSITION
Real Property Disposition Code
Description
describes the future existence of
explains the creation of
RECORD ADDITION REASON
Reason Code
Description
explains the deletion of
RECORD DELETION REASON
Reason Code
Description
Facility Type Code
BUILDING
Real Property Record Number (FK)
Facility Number (FK)
UTILITY
Real Property Record Number (FK)
Facility Number (FK)
STRUCTURE
Real Property Record Number (FK)
Facility Number (FK)
DoDI 4165.14
Real Property Inventory
Logical Data Model
5/15/2001
Business Rules:
1. If a REAL PROPERTY exists as a LAND PARCEL, it cannot exist as a FACILITY.
2. If a REAL PROPERTY exists as a FACILITY, it cannot exist as a LAND PARCEL.
Notes:
GEOLOC is included in this data model however, further analysis is required to determine its use.
IDEF1X SYMBOL LEGEND
PARENT ENTITY
Primary Key Attribute
Owned Attribute
Foreign Key Attribute "FK"
Alternate Key "AK"
Category Label
identifying relationship having zero or one child
identifying relationship having at least one child
Z
P
CHILD ENTITY
Primary Key Attribute (FK)
Category Label
non-identifying relationship
optional non-identifying relationship

The table below lists each entity (box/table in the model above) with the attributes (data elements from inside each entity box in the model above) associated with that entity. Therefore, attributes associated with more than one entity will be repeated.

Metadata Table for DoD Real Property Inventory Data Model

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
ACCOUNTABLE COMPONENT	The DoD service that is responsible for an installation and/or site.		Accountable Component Code	A code used to distinguish one accountable component from another.
			Name	A short title of an accountable component.
BASIC CATEGORY	A further breakout of a category group that classifies facilities by type/use.		Title	A short description of a basic category.
			Category Group Code	A 2 digit numeric code used to group facilities related by function/purpose. Examples: 11 - Airfield Pavements; 12 - Liquid Fueling and Dispensing Facilities; 13 - Communications/ Navigational Aids and Airfield Lighting; and 14 - Land Operational Facilities.
			Investment Category Code	A 2 digit numeric code used to identify certain groupings of service category codes by mission supported. Examples: 01 - Aviation Operational; 02 - Communication Operational; 03 - Waterfront Operational; 05 - Training; 15 - Troop Housing and Messing; 17 - Utilities; and 20 - Family Housing.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			Basic Category Code	A 3 digit numeric code used to classify various real properties by type/use. Examples: 111 - Runways; 112 - Taxiways; 113 - Aprons; and 116 - Other Airfield Pavements.
BUILDING	A roofed, floored and walled facility that is completely enclosed.		Facility Number	A unique code assigned by the Service to denote a specific facility with a distinct CATCODE or multiple CATCODEs.
			Real Property Record Number	A number used to distinguish items in the real property inventory.
CATEGORY-GROUP	An aggregation of one or more category codes that have similar functional purpose.		Facility Class Code	A 1 digit numeric code used to generally categorize a facility. Examples: 1 - Operational and Training Facilities; 2 - Maintenance and Production Facilities; 3 - RDT&E Facilities; and 4 - Supply Facilities.
			Title	A short description of a category group.
			Category Group Code	A 2 digit numeric code used to group facilities related by function/purpose. Examples: 11 - Airfield Pavements; 12 - Liquid Fueling and Dispensing Facilities; 13 - Communications/ Navigational Aids and Airfield Lighting; and 14 - Land Operational Facilities.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
CONSTRUCTION TYPE	The construction criteria/materials used in the facility. A construction criteria and the structural construction material used are both required for each reportable facility.	Construction type is tracked in two categories: 1) All facilities less pavements, and 2) Pavement facilities.	Construction Type Code	A code designating the construction criteria/materials used in the facility. (Permanent, Semi-Permanent, or Temporary construction criteria and the structural construction material used).
			Description	A long narrative describing a construction type.
			Pavement Facility Indicator	An indication of whether or not a construction type is facility-only or pavement facilities.
COUNTRY	The country in which a site is located.		Country Code	The two-letter code for a country in which a site is located.
			Name	A short title for a country.
			Abbreviation	A short name for a country.
FACILITY	An improvement to a parcel of land.		Acquisition Cost or Value	The original cost to the government or the value of a real property.
			Disposal Date	The date on which a real property is or is to be disposed. Use "9999" for facilities with no disposal date.
			Acquisition Date	The date on which the facility was acquired by the reporting agency.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			Plant Replacement Value	The replacement cost of a facility, to the five-foot line, calculated in today's dollars with today's standards for design and construction. It includes supervision, inspection and overhead (SIOH)costs as well as design costs. PRV is calculated by DoD component using the OSD-developed formula as follows: Plant Replacement Value = (Facility Quantity x Construction Cost Factor x Area Cost Factor) x 1.2, where Facility Quantity is the Primary Unit of Measure quantity; Area Cost Factor is the adjustment applied for geographical location; and 1.2 is a 20% adjustment for SIOH and design costs.
			Addition	A unique identifier used to distinguish one reason for adding a real property record from another reason.
			Facility Type Code	A code used to distinguish between categories of facilities (i.e., building, structure, utility).
			Record Marked For Deletion Date	The date on which the real property record is tagged for deletion from the database.
			Record Added Date	The date on which the real property record is created in the database.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			Deletion	A unique identifier used to distinguish one reason for deleting a real property record from another reason.
			Real Property Disposition Code	A code designating the disposition status of a real property.
			Real Property Historical Action Code	A code used to distinguish one historical status of a real property from another.
			Facility Number	A unique code assigned by the Service to denote a specific facility with a distinct CATCODE or multiple CATCODEs.
			Real Property Record Number	A number used to distinguish items in the real property inventory.
			Built Date	The date on which construction of a facility was completed.
			Construction Type Code	A code designating the construction criteria/materials used in the facility. (Permanent, Semi-Permanent, or Temporary construction criteria and the structural construction material used).
			Real Property Status Code	A code used to distinguish one operational status of a real property from another.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			Facility Condition Code	A code designating the physical condition of the facility. Editor's note: Two different facility condition-rating schemes are being considered by DoD. These are: Condition (Good, Fair, Poor) and C-1, C-2, C-3 and C-4, which follow the Congressional Installation Readiness Report (IRR).
			Interest Code	A code that defines the government's legal or financial stake, right, or title to a facility (e.g., owned or leased).
FACILITY ANALYSIS CATEGORY	A certain grouping of Service Category Codes (SCC) used to capture cost factors and units of measure.		FAC Code	A 4 digit numeric code used to identify a certain grouping of Service Category Codes (SCC) for resource planning and analysis purposes.
			Basic Category Code	A 3 digit numeric code used to classify various real properties by type/use. Examples: 111 - Runways; 112 - Taxiways; 113 - Aprons; and 116 - Other Airfield Pavements.
			Title	A short description of a facility analysis category.
			Construction Cost Factor	A numerical value used to calculate the replacement plant value of a real property.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
FACILITY CONDITION	The physical condition of the facility.		Facility Condition Code	A code designating the physical condition of the facility. Editor's note: Two different facility condition-rating schemes are being considered by DoD. These are: Condition (Good, Fair, Poor) and C-1, C-2, C-3 and C-4, which follow the Congressional Installation Readiness Report (IRR).
			Definition	A long narrative describing a facility condition.
FACILITY RECAPITALIZATION	The modernization of a real property facility.		Funding Type Code	A two-digit code that identifies the fund type for sustainment, servicing, or recapitalization of a real property.
			Organization Code	A 2-character code used to distinguish one general type of organization from another.
			Recapitalization Cost	The sum of all capital improvement costs for the life of the facility to include the original acquisition cost.
			Date Time	The moment in time when a facility is modernized.
			Facility Number	A unique code assigned by the Service to denote a specific facility with a distinct CATCODE or multiple CATCODEs.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
FACILITY-CLASS	A particular grouping of facilities based on type of function.		Facility Class Code	A 1 digit numeric code used to generally categorize a facility. Examples: 1 - Operational and Training Facilities; 2 - Maintenance and Production Facilities; 3 - RDT&E Facilities; and 4 - Supply Facilities
			Title	A short description of a facility class.
FAC-UOM	One of the ranked units of measure that applies to a facility analysis category.		FAC Code	A 4 digit numeric code used to identify a certain grouping of Service Category Codes (SCC) for resource planning and analysis purposes.
			UOM Index	A numeric ranking of a FAC's units of measure.
			UOM Code	The two-character code for the FAC UM.
FUNDING ORGANIZATION	An organization which has the financial responsibility of a real property inventory item. Known by a composite three-digit code that identifies the responsible organization (first digit) and the fund type (second and third digits).		Organization Code	A 2-character code used to distinguish one general type of organization from another.
			Funding Type Code	A two-digit code that identifies the fund type for sustainment, servicing, or recapitalization of a real property.
FUNDING TYPE	A category of resources.		Title	A short description of a funding type.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
INSTALLATION	A single site or a grouping of two or more sites for the purposes of operational control. ALIAS: Parent Installation	An installation can exist in three possible forms, as follows: a. A single site designed to be an installation (e.g., Pope Air Force Base). It will have no subordinate sites. b. Several sites grouped with one of the sites designated as the "Installation" (e.g., Fort Belvoir [installation] and Woodbridge Housing [a subordinate site]). c. Several sites grouped together under a single Installation number where all the sites have equal status (e.g., the sites included in the 90th Regional Support Center [RSC]). In this situation the 90th RSC is a Command and Control Headquarters organization but does not exist as a site.	Name	A Service/WHS-unique name assigned to a specific installation.
			Major Command/ Claimant	The Service major command/claimant to which an installation is assigned. Note: WHS does not use major commands.
			Service Component Code	A code used to distinguish one service component from another.
			Accountable Component Code	A code used to distinguish one accountable component from another.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			Installation Code	A service-unique code assigned to an installation that has operational control over a single site or group of sites.
INTEREST	The government's legal or financial stake, right, or title to a facility.		Interest Code	A code that defines the government's legal or financial stake, right, or title to a facility (e.g., owned or leased).
			Title	A short description of the type of interest that the government has in a real property.
			Description	A long narrative describing the interest in a real property.
INVESTMENT CATEGORY	A grouping of service category codes based on the mission they support.		Investment Category Code	A 2 digit numeric code used to identify certain groupings of service category codes by mission supported. Examples: 01 - Aviation Operational; 02 - Communication Operational; 03 - Waterfront Operational; 05 - Training; 15 - Troop Housing and Messing; 17 - Utilities; and 20 - Family Housing
			Title	A short description of an investment category.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
LAND PARCEL	The whole or part of a military site under custody and accountability of DoD as acquired by a legal instrument. Includes land acquired by purchase, condemnation, donation, or transfer. Also includes land furnished rent-free by Host Nation Governments under consignment agreement or real property obligation documents.		Acquisition Date	The date on which the facility was acquired by the reporting agency.
			Interest Code	A code that defines the government's legal or financial stake, right, or title to a facility (e.g., owned or leased).
			Acquisition Cost or Value	The original cost to the government or the value of a real property.
			Disposal Date	The date on which a real property is or is to be disposed. Use "n/a" for facilities with no disposal date.
			Land Type Code	A code used to distinguish between improved, semi-improved, unimproved and other types of land.
			Parcel Number	A unique identifier used to distinguish one parcel of land from another.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.
			Real Property Status Code	A code used to distinguish one operational status of a real property from another.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			Real Property Disposition Code	A code designating the disposition status of a real property
			Real Property Historical Action Code	A code used to distinguish one historical status of a real property from another.
ORGANIZATION	A general category of organization including those at international, federal, military, state/local and private levels, among others.		Organization Code	A 2-character code used to distinguish one general type of organization from another.
			Organization Group Name	A general label used to describe organizations with common characteristics.
			Name	A short title of a grouping of DoD organizations.
ORGANIZATION GROUP	A broad grouping of organization categories.		Organization Group Name	A general label used to describe organizations with common characteristics.
PLACE	The geographic location of a site, as it is listed in FIPS 55-DC3.		State Code	The two-letter code for the state in which a site is located.
			Place Code	A code used to distinguish one place from another.
			County Code	If in the United States, the three-character code (see Enclosure 2, Table Thirteen) for the county in which the site is located. (If not in the United States, use "999.")
			Name	A short title of a place.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			Metropolitan Area Code	If in the United States, the four-character code (see Enclosure 2, Table Fourteen) for the metropolitan area or city closest to the site. (If not in the United States, use "9999.")
			Congressional District	If in the United States, an area within a state having representation in Congress and in which the site is located.
POSTAL ZIP CODE	A code representing a particular mailing zone.		Postal Zip Code	The five-character postal zip code representing the Site's primary mailing address. Use the military post office designator for overseas Sites.
REAL PROPERTY	A parcel of land or a facility in which a Department of Defense (DoD) component has a real estate interest.		Accountable Component Code	A code used to distinguish one accountable component from another.
			Installation Code	A Service/WHS-unique code assigned to an installation that has inventory control over a single site or group of sites.
			Site Code	A Service-unique number/code assigned to a specific site.
			Reporting Military Department	The Military Department or Washington Headquarters Service with responsibility for real property accountability at a given site will be DoD reporting component.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
REAL PROPERTY DISPOSITION	The state of disposition of a real property.		Real Property Disposition Code	A code designating the disposition status of a real property.
			Description	A long narrative describing the type of disposal a real property experiences.
REAL PROPERTY FUNDING ORGANIZATION	The organization whose resources are used to sustain, recapitalize, or service a real property inventory item.		Organization Code	A 2-character code used to distinguish one general type of organization from another.
			Funding Purpose	A descriptor that identifies the use of funds (recapitalization, services, sustainment) provided by the funding organization.
			Funding Type Code	A two-digit code that identifies the fund type for sustainment, servicing, or recapitalization of a real property.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.
REAL PROPERTY HISTORICAL ACTION	The historical status of a real property with respect to placement on the National Register of Historical Places.		Real Property Historical Action Code	A code used to distinguish one historical status of a real property from another.
			Definition	A long narrative describing a real property historical action.
REAL PROPERTY PURPOSE	The particular use of a real property or one of its parts.		UOM Code	The two-character code for the FAC UM.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			FAC Code	A 4 digit numeric code used to identify a certain grouping of Service Category Codes (SCC) for resource planning and analysis purposes.
			UOM Quantity	The size or capacity of a particular real property or part of a real property in terms of a unit of measure.
			Military Service	A specific branch within DoD.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.
			CATCODE	A service-unique category code that denotes the function of the facility. CATCODEs are based upon DoDI 4165.3 guidelines.
REAL PROPERTY PURPOSE USER	A tenant that uses a real property inventory item for its intended purpose.		User Code	A two-character code that identifies the user or users of a facility. In the case of buildings the user is the actual occupant(s). For structures, the user is defined as the organization that has replacement responsibility for the facility.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.
			Allocation Quantity	The size or capacity of a real property that can be used by an organization when it occupies the real property.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			CATCODE	A service-unique category code that denotes the function of the facility. CATCODEs are based upon DoDI 4165.3 guidelines.
			Military Service	A specific branch within DoD.
REAL PROPERTY STATUS	The operational status of a real property.		Real Property Status Code	A code used to distinguish one operational status of a real property from another.
			Description	A long narrative describing a real property status.
REAL PROPERTY UOM	The total size or capacity of a real property in terms of a unit of measure.		UOM Code	The two-character code for the FAC UM.
			Total Quantity	The total size or capacity of a facility as it is measured by the facility's unit of measure.
			FAC Code	A 4 digit numeric code used to identify a certain grouping of Service Category Codes (SCC) for resource planning and analysis purposes.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.
RECORD ADDITION REASON	An explanation for creating a real property record in the database.		Reason Code	A unique identifier used to distinguish one reason for adding a real property record from another reason.
			Description	A long narrative explaining why a real property record is added to the database.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
RECORD DELETION REASON	An explanation for the deletion of a real property record from the database.		Reason Code	A unique identifier used to distinguish one reason for deleting a real property record from another reason.
			Description	A long narrative explaining why a real property record is deleted from the database.
SERVICE CATEGORY	The particular use of a real property.		FAC Code	A 4 digit numeric code used to identify a certain grouping of Service Category Codes (SCC) for resource planning and analysis purposes.
			Title	A short description of a service category.
			Military Service	A specific branch within DoD.
			CATCODE	A service-unique category code that denotes the function of the facility. CATCODEs are based upon DoDI 4165.3 guidelines.
SERVICE COMPONENT	The active, guard, or reserve status applicable within a particular service.		Service Component Code	A code used to distinguish one service component from another.
			Name	A short title of a service component.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
SITE	A contiguous geographical area owned or leased by a DoD component. ALIAS: Sub-Installation	A site may exist in one of the following three forms: a. Land and all the facilities (buildings, utilities, structures) thereon. b. Land only, when there are no facilities (buildings, utilities, structures) present. c. Facilities only (buildings, utilities, structures), when the underlying land is neither owned by, leased, licensed, nor permitted to the government (e.g., a leased office building without the underlying land). For the purposes of this instruction, the term "contiguous" means an area with a continuous, unbroken perimeter. This includes a site traversed by a road, highway, railroad, or narrow body of water but not by a state/country boundary. Sites traversed by state/country boundaries must be reported as a separate site for each state/country portion.	Site Status Code	A code used to distinguish one operational status from another.
			Postal Zip Code	The five-character postal zip code representing the Site's primary mailing address. Use the military post office designator for overseas Sites.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			County Code	If in the United States, the three-character code for the county in which the site is located. (If not in the United States, use "999.")
			Place Code	A code used to distinguish one place from another.
			Installation Indicator	An indication of whether or not a site is designated in a group of sites as the "Installation".
			Site Primary Function Code	A code used to distinguish one primary mission function from another.
			Site Planned Action Code	A code used to distinguish one planned action from another.
			Disposal Date	The actual date on which a site is disposed.
			Accountable Component Code	A code used to distinguish one accountable component from another.
			Installation Code	A Service/WHS-unique code assigned to an installation that has inventory control over a single site or group of sites.
			Site Code	A Service-unique number/code assigned to a specific site.
			State Code	The two-letter code for the state in which a site is located.
			Country Code	The two-letter code for a country in which a site is located.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
			Name	A service-unique name assigned to a specific site.
			DoD Acquisition Date	The date on which the site was acquired by the reporting agency.
			Geographic Location	A four-character code that uniquely identifies the Site. Associated with the GEOLOC is a variety of planning attributes to include precise grid coordinates. GEOLOCs are found in a reference file of the Global Command and Control System (GCCS). The GEOLOC file can be obtained via the National Military Command Center site (http: nmcc20a.nmcc.smil.mil/users/rfa/ref_files.html). DISA JSSC, Pentagon, maintains the GEOLOC file.
SITE PLANNED ACTION	An event that would have future effects on a site.		Site Planned Action Code	A code used to distinguish one planned action from another.
			Title	A short description of a planned action.
			Date	The date on which a planned action affects a site.
SITE PRIMARY FUNCTION	The primary mission function of the site.		Site Primary Function Code	A code used to distinguish one primary mission function from another.
			Title	A long name for a site primary function.
			Description	A long narrative describing a site primary function.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
SITE STATUS	The operational status of the site.		Site Status Code	A code used to distinguish one operational status from another.
			Title	A long name for a site status.
STATE	The state in which the site is located.		State Code	The two-letter code for the state in which a site is located.
			Name	A short title of a state.
			Abbreviation	A short name for a state.
STRUCTURE	A facility classified as other than a building or a utility.		Facility Number	A unique code assigned by the Service to denote a specific facility with a distinct CATCODE or multiple CATCODEs.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.
UNIT OF MEASURE	A standard measurement used to quantify the capacity or size of a real property inventory item.		UOM Code	The two-character code for the FAC UM.
			Description	A long narrative describing a unit of measure.
USER	A military unit, government office, agency, non-DoD organization, or private sector tenant that occupies a real property inventory item.		User Code	A two-character code that identifies the user or users of a facility. In the case of buildings the user is the actual occupant(s). For structures, the user is defined as the organization that has replacement responsibility for the facility.
			Name	A short title of a user.

Entity Name	Entity Definition	Entity Note	Attribute Name	Attribute Definition
UTILITY	A distribution system, commodity source, or commodity collection point that provides a common service or commodity to more than one building or structure.		Facility Number	A unique code assigned by the Service to denote a specific facility with a distinct CATCODE or multiple CATCODEs.
			Real Property Record Number	A locally-assigned number used to distinguish items in the real property inventory.

APPENDIX G: Acronyms

ACES-RP	Automated Civil Engineer System – Real Property Module
ACSIM	Assistant Chief of Staff for Installation Management
AF	Air Force
AFM	Air Force Manual
AIMD	Accounting and Information Management Division of the General Accounting Office
AMC	Army Materiel Command
AR	Army Regulation
ARNG	Army National Guard
ASCII	American Standard Code for Information Interchange
AT&L	Acquisition, Technology and Logistics
BALD	Best Available Lease Database
BC	Basic Category
BRAC	Base Realignment and Closure
CAD	Computer Aided Design
CCD	Category Code Directory
CD-ROM	Compact Disk – Read Only Memory
CFO	Chief Financial Officer
CJCSM	Chairman of the Joint Chiefs of Staff Manual
CMC	Commandant, Marine Corps
CNO	Chief of Naval Operations
COBOL	Common Business Oriented Language
COEs	Common Operating Environments
COMNAVFACENGCOM	Commander, Naval Facilities Engineering Command
COTS	Commercial Off the Shelf
DA	Department of the Army
DB	Database
DBMS	Defense Business Management System
DeCA	Defense Commissary Agency
DFAS	Defense Finance and Accounting Service
DFAS-DE	Defense Finance and Accounting Service, Denver
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DoD	Department of Defense
DoDI	Department of Defense Instruction

DoDEA	Department of Defense Education Activity
DoDIG	Department of Defense Inspector General
DON	Department of Navy
DPAS	Defense Property Accountability System
DPW	Director of Public Works
DUSD(I&E)	Deputy Under Secretary of Defense (Installations & Environment)
EFD	Engineering Field Division
FACs	Facility Analysis Categories
FAD	Facility Assessment Database
FAM	Facility Aging Model
FC	Facility Class
FEMA	Federal Emergency Management Agency
FH	Family Housing
FIPS	Facility Inventory Planning System
FMIP	Financial Management Improvement Plan
FMO	Facility Management Officer
FMR	Financial Management Regulation
FPMR	Federal Property Management Regulations
FSM	Facility Sustainment Model
FTP	File Transfer Protocol
FY	Fiscal Year
FYDP	Future Years Defense Plan
GAO	General Accounting Office
GEOLOC	Geographical Location Code
GGD	General Government Division of the General Accounting Office
GIS	Geographic Information System
GSA	General Services Administration
GUI	Graphical User Interface
HQ	Headquarters
HQAF	Headquarters, Air Force
HQEIS	Headquarters, Executive Information System
HQDA	Headquarters, Department of the Army
IAW	In Accordance With
IFS-C/S	Integrated Facilities System-Client/Server (same as IFS)
IG	Inspector General
iNFADS	Internet, Navy Facility Assets Data Store
IRR	Installations' Readiness Report

IT	Information Technology
IWIMS	Intermediate Work Information Management System
JCCS	
JCS	Joint Chiefs of Staff
JRS	Joint Reporting Structure
LAN	Local Area Network
MACOM	Major Command
MAGIC	Master Activity General Information Control
MAJCOM	Major Command
MS	Microsoft
NAVFAC	Short term for NAVFACENGCOM - Naval Facilities Engineering Command
NCR	National Capital Region
ND	National Defense
ND PP&E	National Defense Property, Plant and Equipment
NGB	National Guard Bureau
NITC	Naval Information Technical Center
OASD(HA)	Office of the Assistant Secretary of Defense (Health Affairs)
OCG	Office of the Comptroller General, General Accounting Office
OCONUS	Outside the Continental United States
OD(PA&E)	Office of the Defense Director (Program Analysis & Evaluation)
OUSD(C)	Office of the Under Secretary of Defense (Comptroller)
ODUSD(I&E)	Office of the Deputy Under Secretary of Defense (Installations & Environment)
OMB	Office of Management and Budget
OSD	Office of the Secretary of Defense
POM	Program Objective Memorandum
PP&E	Property, Plant and Equipment
PRIDE	Planning Resource for Infrastructure Development and Evaluation
PRV	Plant Replacement Value
QDR	Quadrennial Defense Review
RDT&E	Research, Development, Test and Evaluation
ROICC	Resident Officer-in-Charge of Construction
RP	Real Property
RPI	Real Property Inventory
RPM	Real Property Maintenance
RPMA	Real Property Maintenance Activities
RSC	Regional Support Center

SCC	Service Category Code
SFPS	Shore Facilities Planning System
SGL	Standard General Ledger
SORTS	Status of Resource and Training System
STAMIS	Standard Army Management Information System
SWOT	Strengths, Weaknesses, Opportunities and Threats
UM	Unit of Measure
UOM	Unit of Measure
USC	United States Code
USD(AT&L)	Under Secretary of Defense (Acquisition, Technology and Logistics)
USD(C)	Under Secretary of Defense (Comptroller)
USPFO	U.S. Property and Fiscal Office
WAN	Wide Area Network
WCF	Working Capital Funds
WHS	Washington Headquarters Services
WIMS	Work Information Management System